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ABSTRACT

This study determined if the required use of state-adopted education specifications guidelines when constructing or modernizing urban high school facilities had resulted in more adequate housing for programs than in states without such guidelines. A 1991 survey of high school classroom teachers was returned by 8 schools totaling 113 respondents. Findings indicate that high school facilities are more adequate for instruction programs when constructed according to state-adopted guidelines for the development of educational facilities. This conclusion applied to the following school facility features: location and site; structural, mechanical, electrical, maintenance features; and educational adequacy in academic, special, and support areas. The existence of state guidelines was found to have no significant affect on perceptions of external aesthetic appearance of the facility, although the perceptions of facility adequacy relating to internal environmental features were higher among the teachers in states with guidelines. Appendices provide the questionnaire, correspondence, and weighted responses to questionnaires. (Contains a 53-item bibliography.) (GR)

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STATE GUIDELINES FOR EDUCATIONAL SPECIFICATIONS AND SCHOOL FACILITY ADEQUACY

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A DISSERTATION

Presented to the Faculty of

The Graduate College in the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Doctor of Education

Major: Interdepartmental Area of Administration, Curriculum and Instruction

Under the Supervision of Professor C. Cale Hudson

Lincoln, Nebraska

December, 1991

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STATE GUIDELINES FOR EDUCATIONAL SPECIFICATIONS

AND SCHOOL FACILITY ADEQUACY

Antoinette E. Turnquist, Ed.D.

University of Nebraska, 1991

Advisor: C. Cale Hudson

The design of public school facilities is important for educators concerned with curriculum change and sophistication of information delivery. In the absence of guidelines for facility design, educators and architects can fail to solve design problems that inhibit program development.

The purpose of this study was to determine if, in the opinion of selected classroom teachers, the required use of state-adopted educational specifications guidelines when constructing or modernizing urban high school facilities had resulted in more adequate housing for programs than the perceived adequacy by classroom teachers in newly constructed or modernized urban school facilities in states without such guidelines.

Data for the study were obtained through a survey of high school classroom teachers in January and February of 1991. Teachers in six states participated in the survey. Three of the six states had educational specifications guidelines in place and three did not; the respondents were grouped accordingly.

The research hypothesis for this study was: High school classroom teachers have a significantly more positive opinion of the

adequacy of their school's facilities in states that require the use of state-adopted educational specifications than do those in states without such requirements. In formulating the statistical hypotheses, the .05 level of significance was set for the analysis of data. The Wilcoxon Matched-Pairs Signed-Ranks test was used to determine the significance of any difference in the distribution of scores of the two groups surveyed.

The conclusion from the study was that high school facilities are more adequate for instruction programs when constructed according to state-adopted guidelines for the development of educational specifications documents. This conclusion applied to the following features of a school facility: (1) location and site, (2) structural, mechanical, electrical, maintenance features, and (3) educational adequacy in academic, special, and support areas. The existence of state guidelines was found to have no significant affect on perceptions of external aesthetic appearance of the facility, although the perceptions of facility adequacy related to internal environmental features were higher among the teachers in states with guidelines.

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A.E.T.

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CHAPTER I

INTRODUCTION

Context of the Problem

Educational systems are and should be constantly evaluated, especially so in a society undergoing constant social and technological change. Public education serves a multitude of needs with ever-expanding information and instructional systems. An awareness of rapid change should result in a proactive approach to curriculum development. A proactive approach is necessary, also, in planning educational facilities that can be functional, efficient, and economically modifiable for extended use.

The design of public school facilities is important for educators concerned with curriculum changes affected by developing technology and increasingly sophisticated processes of information delivery. No subject area is without trends that will, over the next decade, call for altered facilities. From new laboratories that unite formerly unrelated departments, such as science and industrial education in technology courses, to new teaching stations that promote the incorporation of the study of more history/criticism/aesthetics in art classes, the need is for flexible-use space in school facilities. Structures yet to be built and structures to be modernized must move away from the rigid, linear design dictated by lighting and mechnical systems of the past.

The proper order of steps in designing school plants calls for facilities designed to fit programs, not the reverse. Important, also, is facility design that will be flexible enough to allow for future modification that is both structurally and economically reasonable. This level of planning has complex requisites that call for an understanding of educational trends, careful demographic projections, and insight with regard to the possibilities of flexible-use space. Architects, alone, cannot be expected to have ready knowledge of all aspects of curriculum change. Educators, alone, cannot be expected to envision all of the possible solutions in creating spaces that serve both functional and aesthetic needs.

To search for a method of planning that would unite the best information of facility designers and facility users in a format that would guide planners toward the best architectural solutions is logical. In the absence of guidelines for facility design, educators and architects can fail to solve design problems that inhibit program development. Since public education is a function of state government, the determination of what assistance states provide school officials in the development of educational specifications for school facility construction and modernization seems appropriate. The concern should be whether any assistance provided has an effect on the adequacy and flexibility of school facilities.

The involvement of state governments in school facility design is not uniform from state to state. Differences exist in both the type and the degree of state involvement. A study (State

Requirements Survey for School Construction K-12) was conducted in 1981 by the American Institute of Architects to identify the ways in which state governments contributed to school facility design. That survey was updated in 1987. The study sought information about state participation in nine topical categories:

1. Method of funding school construction
2. Pre-planning to determine eligibility and need for school facility construction
3. Planning for school facility construction
4. School site size
5. Student/teacher ratio
6. Building area allowances (footage requirements per student and by function)
7. Urban-suburban sites
8. Construction document review
9. Construction period

The survey indicated state requirements with only brief descriptions in some cases. The survey drew no conclusions on the effect of the extent of state requirements.[1]

Aside from issues of funding and contractual agreements, the fundamental concern in school facility construction and modernization must be for the usefulness of the facility. More information is

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[1]Committee on Architecture for Education, State Requirements Survey for School Construction K-12 (New York: American Institute of Architects, 1987), n.p.

needed in terms of what guidance states provide and what effect that guidance has on the adequacy, as perceived by staff members, of school facilities to meet program needs.

Purpose of the Study

The purpose for this study was to determine if, in the opinion of selected classroom teachers, the required use of state adopted educational specifications guidelines when constructing or modernizing urban high school facilities had resulted in more adequate housing for programs than the adequacy perceived by classroom teachers in newly constructed or modernized urban school facilities in a state where such specifications were not required.

School building adequacy is related to a structure's (1) flexibility in serving the space needs of current curriculum and potential curriculum change, (2) infrastructure (mechanical/electrical systems) adequacy for meeting daily needs, and (3) health and safety conditions. School buildings included in this study were urban high schools constructed or modernized between 1965 and 1989. The educators surveyed in this study were classroom teachers who worked in the selected schools. For the purpose of this study, a state considered to have state guidelines for educational specifications was one that provided direction in planning for school facility construction and modernization in relation to: (1) educational program needs; (2) flexible space for curriculum development, teacher planning, student activities, storage, and mechanical

operations; and (3) infrastructure adequacy.

Statement of the Hypothesis

The hypothesis tested in this study was: High school classroom teachers have a significantly more positive opinion of the adequacy of their school's facilities in states that require the use of state-adopted educational specifications guidelines than do those in states without such requirements.

Theoretical Perspective

The planning of a school facility must take into consideration needs that are specific to particular areas of the curriculum or school services and shared needs. That guidelines for such planning would be helpful in the development of a facility plan is reasonable if the assumption is that skills for such planning are not uniform from place to place. A logical source of direction would be the state as the unit ultimately responsible for education.

In management theory, the kind of planning that regulates or guides decisions and activities that are non-routine is referred to as action planning. Action planning may be applied to work flow in an organization or to construction plans. Such planning is concerned with function and is the type of planning under which guidelines for developing school facility specifications would best fit.

Mintzberg discussed action planning in business organizations in general.[2] His discussion can be extrapolated to educational facility planning with regard to the importance of curriculum change and how it is affected by facility design. Action planning includes not only design of the structure and strategies but, also, schedules. Complete educational specifications documents for a facility should include curriculum needs and changes, architectural solutions, budget, and phased sequence of construction or remodeling/modernization work.

Fayol wrote of the importance of planning in business management and identified both flexibility and continuity as essential features of good plans.[3] The need to plan for changes in probabilities was focused on by Drucker.[4] Since then, management theorists have repeatedly emphasized the role of change, the changing environment, and developing trends as fundamental concerns in business management and in educational administration. In planning a school facility, change and recognized trends must be understood in order to provide a functional school building. Equally important is the need to construct buildings and modernize existing structures in such a way

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[2]Henry Mintzberg, The Structure of Organizations (Englewood Cliffs, New Jersey: Prentice-Hall, 1979), pp. 149-50, 152-60.

[3]Henri Fayol, General and Industrial Management (London: Isaac Pitman and Sons, 1949), pp. 44-45.

[4]Peter F. Drucker, "Long-Range Planning: Challenge to Management Science," Management Science, 5, no. 3 (n.d.): 238-49.

and with such materials and building systems that future modifications will be economically and structurally possible.

Steiner wrote that long-range planning involves a series of steps, one of which is planning to plan.[5] In a sense, the guidelines for educational specifications that a state might provide for school facilities could be viewed as a kind of planning to plan. Those guidelines can establish an awareness of both need and procedure. While they should not cause all school buildings to look alike, they could cause all school buildings to function well and to be adaptable to change.

A legitimate question regarding the role of the state in action planning for educational specifications has to do with the extent of detailed control over facility design. Guidelines must be detailed enough to be helpful but can and should be nonconstraining. This view of the state's role is in keeping with management theory, in that the broader responsibilities of the state in education should preclude the state's involvement with specific actions.

In brief, management theory with regard to action planning would indicate that if guidelines for overall planning exist, functional structures can be produced because those guidelines can be converted to meet specific needs in anticipation of change. The theory is applied to this study.

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[5]G. A. Steiner, "Making Long-Range Company Planning Pay Off," California Management Review, 4, no. 2 (n.d.): 28-41.

Definitions

In the process of replacing or renovating a school building, definite procedural steps are best communicated when there is a common understanding of terms. The terms listed here are used in this study and are found repeatedly in the literature. A specific source for each description has been noted. Terms are listed alphabetically for easy reference.

Aesthetics. That which deals with the visually attractive.[6]

Auxiliary space. Spaces in the educational facility that support the instructional program and accommodate out-of-classroom needs of both students and staff.[7]

Curriculum. The plan for providing sets of learning opportunities for persons to be educated.[8]

Curriculum change. Changes in any or all of the following: (1) subject matter or materials, (2) organizational structure, (3) role/behavior, (4) knowledge and understanding, (5) value internalization, and (6) models of instructional system.[9]

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[6]Judith Jenkins, ed., Guide for Planning Educational Facilities (Columbus, Ohio: Council of Educational Facility Planners, 1985), p. I4.

[7]Jenkins, p. H2.

[8]J. Galen Saylor, William M. Alexander, and Arthur J. Lewis, Curriculum Planning: For Better Teaching and Learning, 4th ed. (New York: Holt, Rinehart, and Winston, 1981), p. 8.

[9]Saylor, Alexander, and Lewis, p. 76.

Educational specifications. Directions that address facility requirements in meeting the needs of specific programs in existence, curriculum change, building infrastructure, auxiliary spaces for teacher planning, and student activities, storage, and mechanical operations.[10]

Fenestration. The arrangement, proportioning, and design of windows and doors in a building.[11]

Flexible-use space. Teaching spaces that allow for variety, informality, movement, the availability of learning resources and that can be modified.[12]

Infrastructure. Electrical system and power supply, mechanical systems of heating/cooling/plumbing/ventilation, fenestration, security system.[13]

Instructional system. Any means of imparting educational information such as lecture, audiovisual presentation, computer usage, telecommunciations, and textbooks.[14]

Modernization. The major change process of bringing a building up to date structurally and educationally with spaces

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[10]Jenkins, p. E2.

[11]Harold L. Hawkins and H. Edward Lilley, Guide for School Facility Appraisal (Columbus, Ohio: Council of Educational Facility Planners, 1986), p. 39.

[12]Jenkins, p. I2.

[13]Jenkins, p. C11.

[14]M. Francis Klein, About Learning Materials (Washington, D.C.: Association for Supervision and Curriculum Development, 1978), p. 29.

reshaped, parts of the structure or service equipment restored or improved, interior or exterior surfaces replaced or recovered, and modern service equipment installed.[15]

Program. Any curricular offering or student personnel service of the school.[16]

School facility adequacy. The degree to which a school building meets the daily needs of curriculum programs, students, and staff, as well as that building's perceived capacity for meeting the needs of coming curriculum change either in the building's current physical state or in its potential for ease of future modification.[17]

State guidelines. Mandated and/or advisory directions by the state for planning and design criteria for school facility construction and remodeling/modernization.[18]

Teaching station. Specific locations associated with a learning area designed to provide a support system for instruction.[19]

Technology. An evolving process that enables the development of many products and procedures that will exert an influence on

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[15]Basil Castaldi, Educational Facilities: Planning, Modernization, and Management (Boston: Allyn and Bacon, 1987), p. 371.

[16]Charles L. Wood, Everett W. Nicholson, and Dale G. Findley, The Secondary School Principal: Manager and Supervisor, 2nd ed. (Boston: Allyn and Bacon, 1985), p. 252.

[17]Hawkins and Lilley, p. 1.

[18]Committee on Architecture for Education, n.p.

[19]Hawkins and Lilley, p. 41.

education.[20]

Assumptions

The assumptions that related to this research were as follows:

1. Purposeful planning of educational facilities to meet specific needs is both possible and essential.

2. Educational specifications can be put into written form to enhance communication between educational planners and architects.

3. Appraisal of the quality and educational effectiveness of a school facility is possible.

4. Those most familiar with a facility and the educational program in that facility are reasonable judges of facility adequacy.

5. Classroom teachers responded in good faith to the survey instrument.

Delimitations and Limitations

Delimitations in this study were:

1. The sample surveyed in this study was confined to high school classroom teachers in comparable districts in urban areas in states with extensive state guidelines for educational specifications and in states without such guidelines.

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[20]David Foster, "Technology: Implications for Long-Range Planning," Educational Technology, 28 (April, 1988): 8.

2. This study focused on urban high schools built or modernized within the period 1965-1989 in those states.

Possible limitations of the study were:

1. This study was subject to those weaknesses inherent in a survey design such as:

   a. less than 100 percent response to the questionnaire
   b. response effect (tendency to give inaccurate reponses due to predispostion of the respondent or misunderstanding the questionnaire)

2. The results of this study may not be valid for states other than those included in the survey.

3. The results of this study may not be generalizable to all school facility construction.

Significance of the Study

The significance of this study for practitioners is as an indicator that there are specific concerns in school facility planning that should not be overlooked, and that guidelines for the planning of educational specifications should and do exist. Without such an awareness, educators who have had little experience in building planning and architects who are not specialists in school design are at a disadvantage.

The significance of this study for scholarly research in the field is that it fills a void in educational research in general. There is a need to determine, from research, what educational

specifications guidelines might be most helpful and how they can best be made available to school districts. A study of staff perceptions of school facility adequacy with and without such guidelines is a logical step in educational research.

The results of this study could be used by educators involved in planning new school construction and in planning for modernization of older structures. Opinions of classroom teachers relative to building adequacy by selected characteristics provide insights into factors related to expectations for the use of the building.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

The purpose of the section is to review selected literature on school facility design in relation to the role of educational specifications documents in school facility construction and modernization. The review is presented in three major divisions. The first division, Educational Specifications and Purpose, includes sections on adequacy of school facility design, the role of educational specifications in facility planning, and change as a factor in developing educational specifications. The second division, State Involvement in Educational Specifications, includes sections on what states now do and what the literature advocates in relation to state involvement. The third division of the review, Obsolescence of School Facilities, includes sections on planning for technological change and curriculum trends, assessment of existing facilities, and decision making in construction versus modernization choices.

Educational Specifications and Purpose

Adequacy of School Facility Design

The literature reviewed on school facilities contained no reference to studies of a relationship between the existence or extensiveness of educational specifications documents and perceived

adequacy of school facility design. The literature on facilities consisted of expert opinion rather than actual research. White pointed out that, although the evaluation of existing buildings has long been practiced, only in the last ten years has post-occupancy evaluation become a systematic process that can contribute greatly to improved building design.[1]

Day believed that a school facility can affect the degree of success of its students and teachers. A school building, Day stated, must facilitate current curriculum and future change in curriculum, while adapting to changing demographics. The design of the educational facility should be based on the school philosophy and program. Day claimed that there appeared to be a steady increase in awareness of the importance of the physical facility in the success of a school.[2]

Role of Educational Specifications in Facility Planning

Thorough analysis of and clarity in communicating the educational program of a school are essential to the production of what Bullock called the construction documentation (graphic and written plans). Bullock wrote that good facility design is based on educational specifications which respond to a school's current program with creativity and efficiency for the present and which, also, address the need to adapt to change that will inevitably take place

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[1]Edward T. White, "Post-Occupany Evaluation," CEFP Journal, 24 (November-December, 1986): 19-22.

[2]C. William Day, "Managing Tomorrow's Facilities," Managing Limited Resources: New Demands on Public School Management, eds. L. Dean Webb and Van D. Mueller (Cambridge, Massachusetts: Ballinger, 1984), pp. 203-219.

over time. Curriculum trends and instructional delivery systems, as well as the aesthetic impact of the facility, must be considered in projections twenty to thirty years into the future. Without well-documented educational specifications, Bullock claimed, good design is not possible and the result will be a structure that fails as an educational facility.[3]

The Council of Educational Facility Planners, International published an extensive work that covers all aspects of planning, assessing, constructing, and altering school facilities. The work identifies the development of educational specifications as the most important pre-design activity. The educational specifications document is the means of communication between educator and architect, linking the educational program with the technical statements and working drawings for the project.[4]

Educational specifications are described as essential to a process in which educators clarify needs and architects respond successfully to those needs. Graves listed some of the issues in educational facility planning. One issue of great concern was the need for better preparation of school administrators in facility planning.[5]

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[3]Ellis W. Bullock, Jr., "Design and the Design Process," CEFP Journal, 24 (November-December, 1986): 4-5.

[4]Judith Jenkins, ed., Guide for Planning Educational Facilities (Columbus, Ohio: Council of Educational Facility Planners, 1985), p. D6.

[5]Ben E. Graves, "Facility Planning," American School & University, 54 (December, 1982): 11.

Castaldi identified the written educational specifications for a facility as the link between the educational program and school facilities. Castaldi wrote that educational specifications must be clear and concise in setting forth the activities of the educational program with that program's unique features and space requirements. These specifications are essential to architects who may have experience in planning schools, but cannot be asked to do the educational planning in addition to the architectural planning. According to Castaldi, there is no one best way to organize the educational specifications. He suggested, however, a three-part presentation. Part one should contain information on the educational program with details on all activities and instructional processes to take place. Part two should include all numerical information such as numbers of students, types of teaching spaces, size of spaces, and location of spaces in terms of relationships between and among subject areas. Part three should include details on all special features such as ceiling heights, climate control, acoustics, and lighting. Castaldi emphasized that the likelihood of the acquisition of the facility needed is dependent upon the quality of the educational specifications document. Clarity and detail are essential.[6]

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[6]Basil Castaldi, Educational Facilities: Planning, Modernization, and Management (Boston: Allyn and Bacon, 1987), pp. 142-45.

Change as a Factor in Developing Educational Specifications

Day and Speicher emphasized that change is inevitable. Identifying some of the technological developments, computers, new building materials, fiber optics, and science, Day and Speicher called for educational facilities that are humane, energy efficient, productive, effective, and flexible. Flexibility is, in their view, a top priority, making possible space changes with "minimal effort and cost." In selecting architects for facility projects, emphasis must be placed on experience with and understanding of educational needs and program change. Day and Speicher noted that what counts most is the educational program. That program must be defined in terms of facility development by written educational specifications with regard to expected activities, equipment and furniture, space requirements, and space relationships. Educational specifications become the architect's most important guide.[7]

Planning for trends in computer education and efficient utilization of changing technology should eliminate the likelihood of haphazard facility configuration, according to Moran.[8]

Thirty-four suggestions for avoiding planning errors in the design of educational facilities was offered by Campanale. Some of the suggestions dealt with technical and mechanical design

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[7]C. William Day and A. Dean Speicher, "Planning for the 21st Century," American School & University, 58 (November, 1985): 7-8.

[8]Thomas Moran, "The Ideal Computer Lab from Floor to Ceiling," Technology Trends, 32 (March, 1987): 18-20.

considerations, such as sound transmission between areas of the school and appropriate type of heating sytem. At the top of the list were suggestions regarding projected program needs and anticipated changes of instructional methods. Other items had to do with the aesthetic impact of the facility.[9]

The myriad of considerations to be dealt with in planning educational facility space for change in special areas was listed by Campanale. For the area of physical education alone, Campanale identified nineteen major topics of consideration. He listed twenty-nine considerations related to library planning and sixteen topics to be considered in relation to administrative office space.[10]

Collins believed that schools of the future will have to be better than ever because of the knowledge explosion, an increasingly complex society, new technology, societal and psychological problems, and competition world-wide among other trends. He wrote that every facility must be adaptable to high technology and computers, and that older schools must be modernized to provide equal facilities for all students. Collins claimed that the design and quality of construction of school buildings can enhance both learning and teaching. This was true in the implementation of technology and the aesthetic effect of a structure on its users. Collins noted that one of the most important

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[9]Eugene A. Campanale, "How to Avoid Planning Errors," American School & University, 58 (May, 1986): 23.

[10]Eugene A. Campanale, "How to Plan Special Facilities," American School & University, 58 (May, 1986): 103-107.

needs in improving school design is better educational specifications documents communicating between educator and architects the program needs of schools. Modernizing school facilities, he said, must be done in spite of already strained budgets if equal educational opportunity is to be achieved nationwide and districtwide.[11]

State Involvement in Educational Specifications

What States Do

The Council of Educational Facility Planners, International presented a discussion for guidance in facility planning, emphasizing the benefits of state input but noting that the degree of state guidance varies greatly and is not necessarily mandated as a part of a local school district's planning process. Some states may have final approval authority over finished facility plans, whereas others do not.[12]

Graves wrote that an important issue is the need to recognize planning as a continuous process and one that is increasingly important in relation to modernization and remodeling projects. Whether the role of the state should be advisory or regulatory is a controversial issue. Graves said that formal regulations will always be centered in the funding agency, and states do not necessarily provide funds for facility construction or modernization.[13]

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[11]George J. Collins, "School Design Then, Now. . . and Soon to Be," American School & University, 60 (December, 1987): 12-13, 117-18.

[12]Jenkins, p. B9.

[13]Graves, p. 11.

The American Institute of Architects identified forty-four states as having some state requirements or educational specifications guidelines for the planning stage of school facility construction or modernization. The nature and extent of the requirements or guidelines varied. All forty-four offered at least a state level review of planning, but did not mandate it. Only twenty-seven of the forty-four states that offered a state level review of planning had specifically designated planning agencies. In constrast, states that mandated extensive requirements and use of guidelines included such things as approval of design development, schematic and preliminary design, final working drawings, compliance with state educational specifications, uniform building codes, and, in some states, contract documents.[14]

What the Literature Advocated

Authors advocated a proactive approach at the state level to facility design. Foster claimed that technological possibilities have outdistanced the capacity of educational institutions to use them. The key to solving this problem, according to Foster, is long-range planning. Past difficulties in implementing technologies should teach how to plan for the future. Foster noted that the 1986 National Task Force on Educational Technology recommended an educational environment in which changing technology could be adapted. He also

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[14]Committee, on Architecture for Education, State Requirements Survey for School Construction K-12 (New York: American Institute of Architects, 1987), n.p.

noted that the National Governors' Association Center for Policy Research and Analysis encouraged states to help schools prepare modernized plans for using technology and to assist schools in finding ways to restructure school environments that will promote greater production through educational technology. Foster wrote that state planners in Texas were looking at how technology may affect facilities. The Texas Education Agency, he said, had funded the development of a long-range plan for a statewide educational delivery system for the public schools. A focus of this plan was on the importance of flexibility in working with changing technology.[15]

Blaschke addressed the use of microcomputers in education in relation to state-level planning for technology. According to Blaschke, a key problem that should be addressed is technological obsolescence that can result from inadequate planning.[16]

Kauffman and Lamkin cited changes in microcomputer technology approximately every five years. The authors presented a plan for the Houston Independent School District for the years 1988-2003 to modernize facilities in relation to microcomputer technology. The plan was developed in increments of five years to correspond with computer technology development. Kauffman and Lamkin pointed out that, in extended projections, the facility development to accommodate

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[15]Foster, pp. 7-14.

[16]Charles L. Blaschke, "State Education Agency Planning Strategies and Policies for Technology Use," Education and Computing, 3, no. 1-2 (1987): 29-37.

this technology will be more efficient and more cost-effective in relation to information storage and access, student-owned notebook computers, research, instructional presentations, planning and budgeting, and clerical chores. The Houston plan encompassed facility design to allow for flexibility that adjusted not only to changing equipment but, also, to different styles of instruction, such as direct instruction, individualized tutoring, and large group or cooperative learning in the use of equipment. Other important considerations with regard to computer technology included lighting, noise control, and climate control. Kauffman and Lamkin emphasized that, because changes in facility needs are inevitable, flexible building design can make future modifications more cost-effective and reasonably easy to complete.[17]

Graves believed North Carolina's Division of School Planning produced an excellent leaflet listing the do's and don'ts in designing an educational facility. Educators, architects, and engineers reviewing state school plans compiled the lists. The importance of planning for change, however, seemed to be a key to the emphasis placed by most authors on the need for more indepth guidelines at the state level for facility design.[18]

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[17]Draper Kauffman and Charles Lamkin, "Designing Schools for Tomorrow's Technology," Education Digest, 50 (March, 1985): 54-57.

[18]Ben E. Graves, "Facility Planning," American School & University, 54 (February, 1983): 17-18.

Stewart noted that equity in facilities was receiving increased attention and that many leaders in school finance and facility management advocated greater state involvement for the purpose of equalizing facility construction and renovation.[19]

Obsolescence of School Facilities

Planning for Technological Change and Curriculum Trends

Day and Speicher wrote that a basic premise on which schools must operate is that public education is changing and will continue to change in the twenty-first century. Indeed, Day and Speicher claimed the changes will be revolutionary in terms of both educational content and required facilities. Thus, comprehensive and highly organized planning is required if the educational needs of society are to be met.[20]

A term found repeatedly in the literature on facility design was "flexibility," meaning space that is modifiable for both avoidance of obsolete facilities and the control of costs. Graves claimed that curriculum and program ideas must be considered as challenges in the design of school facilities that must last for 50 to 60 years. The traditional design of the schools is or will soon be obsolete in view

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[19]G. Kent Stewart, "Some Old Questions Revisited," CEFP Journal, 23 (September-October, 1985): 12-14.

[20]C. William Day and A. Dean Speicher, "Flexibility Underscores Educational Facilities of the Future," School Business Affairs, 52, No. 4 (1986): 64-67.

of the information explosion, energy revolution, and government and management movement away from centralization. Graves wrote that while attending a recent American Institute of Architects Convention, he heard architects, scientists, and consultants emphasize change and the future in discussions of the public schools and the assessment of existing school buildings.[21]

Hathaway and Fielder wrote a significant overview of concerns and needs in educational facility design with emphasis on the impact of program changes and curriculum trends. They identified planning that can avoid early obsolescence as essential to the process of school building design. The authors discussed key factors that will affect future education and how the changes brought about have implications for facility planning. Those key factors included long-term trends, such as the knowledge explosion, communications technology, and the use of computers; competitiveness in the world market; public demands for accountability in education; specific curriculum trends that change both content and delivery of content; economic instability; integration of curriculum areas, people, and planning at local, state, and national levels; and cultural pluralism.[22]

Stewart wrote that, whereas a little less than thirty years ago large school districts and several states had standards for

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[21]Ben E. Graves, "Is Education Ready for the Future?" American School & University, 54 (August, 1983): 10-11.

[22]Warren E. Hathaway and D. Robert Fiedler, "A Window on the Future: A View of Education and Educational Facilities," CEFP Journal, 25 (March-April, 1987): 4-17.

planning in place, the standards had to do with space allocation per pupil but did not address the suitability of the space for program needs. Stewart said planning that gives primary consideration to changing techniques and technology in several areas of curriculum is essential. Flexibility and adaptability in planned space are important keys to cost-effectiveness.[23]

Swenson pointed out the need to plan educational facilities that will easily be adapted to inevitable educational change and that will not constrain educational programs. The ultimate objective to be kept in view in planning a facility is an educational environment that can be modified as time passes and that will not be limiting in terms of curriculum.[24]

Cummings, Jensen, and Todd reviewed the prospects for technology education in the immediate future (within the next five years) and beyond (ten years and longer). The organization of technology curriculum will, they said, be based on clusters or areas of study. The authors suggested labels for such areas include Production, Transportation, Communication, Energy, Information, and Materials. According to Cummings, Jensen, and Todd, school facilities must be built or modified to allow for flexibility in labs and other instructional methods. The authors claimed that a lab must be flexible

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[23]Stewart, pp. 12-14.

[24]Earl S. Swenson, "Climbing Mount Technology with Smart Buildings," CEFP Journal, 25 (March-April, 1987): 21-23, 36.

open space that will permit work stations, areas for small group cooperation, and locations for individual instruction. Rather than teaching only what will fit a facility, facilities must be designed to make new activities possible. According to the authors, technology education, in many cases, is being limited by existing facilities.[25]

Gardner has written about trends identified by John Naisbith in his book Megatrends, in terms of what those trends mean for the design of educational facilities. Gardner suggested that what is needed is increased broad participation in planning a facility in order to avoid construction of school facilities similar to quickly and cheaply built facilities in the 50s and 60s. Gardner believed this type of building planning will not be acceptable in the future. The idea that planning is worthless if goals are not well-defined means, according to Gardner, that facility design must involve long-range planning for curriculum trends. The trend toward increasingly efficient technological advances must be accompanied by a recognition of the need for human interaction. Schools, he said, must be designed for comfort and human interaction as a buffer to the impersonal aspects of technology.

Gardner pointed out that as society moves from an industrial age to an information age, there will be a move away from the factory-like, top to bottom controlled, school facilities of the

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[25]Paul L. Cummings, Michael Jensen, and Ronald Todd, "Facilities for Technology Education," The Technology Teacher, 46 (April, 1987): 7-10.

past. Thus, the move will be away from egg carton design floor plans, finances dictating space provided, concern for construction costs overriding operational costs, lack of creativity in design, fad, and facilities that do not represent a concern for environmental effects on people. Broad participation in planning, long-range curricular vision, flexibility, sensitivity to environmental impact, technological developments, and new construction techniques are essential to good facility planning, according to Gardner. Specific applications of these essential considerations should be applied to all areas of school operations.[26]

Hathaway and Fiedler reviewed three possible scenarios for future education: the superindustrial, a technologically based system that reduces human contact in both the teacher-student and student-student domains; the authoritarian or economic scenario, a system that would produce entrepreneurs, risk-takers, and people who take control; and the ecological scenario, a system in which people are significant in terms of their individual differences, not in terms of their societal worth as entrepreneurs and controllers. The authors claimed that, whatever the image of the future, educational facilities must be designed for adaptability. The scope of planning for such structures must be broad.[27]

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[26]Dwayne E. Gardner, "School Buildings in the Future," CEFP Journal, 25 (March-April, 1987): 24-27.

[27]Hathaway and Fiedler, pp. 4-17.

Technolgoical advances in curriculum content and delivery, as well as technological advances in the construction of facilities, are and will continue to be rapid, according to O'Connor, a senior manager with CRSS Constructors, Inc. Educators and designers must work together to create what O'Connor called a framework for reacting to change. Planners must select and work with appropriate technologies, keeping in mind the fact that current technologies may be obsolete, even as the life of the building has just begun.[28]

Porter has written that significant change is taking place in the design of new school facilities and in the remodeling of old. The change is related to development and change in several areas, including demographics, the economy, educational programs, and societal needs. The result of such development has produced a search for both unique structures and unique planning processes. The key focus, according to Porter, should be on the facility as a revenue-yielding investment and a multi-usage facility. Porter, an architect, emphasized the importance of flexibility in the structure's design for the following purposes:

1. Immediate internal functional flexibility
2. Variable sizes of space
3. Reshapeability for easy future modifications
4. Logical and simple expansion potential

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[28]Dennis M. O'Connor, "Developing the School of Tomorrow," Industrial Education, 76 (May, 1987): 32-33.

5. Predesigned convertibility for other uses or total removal

In Porter's view, this flexibility allows easy adaptation of the facility to changing educational trends.[29]

Brubaker addressed what he viewed as trends affecting, or that should affect, school facility design. Some of the trends had to do with cost considerations and concern for maintenance. Others were directly related to curriculum trends in terms of content and/or instruction methods. Brubaker contended that changes in the way students are taught are important to facility design. Identified among those changes were increased computer usage in all subject areas, adaptation of class size to the nature of the activities, independent study development, magnet schools of specialization, more sophisticated career education, and expanded adult education programs.[30]

Brubaker presented an optimistic view of the value people place on good schools and, consequently, on good school facilities. He saw the future of educational facilities in a very positive light. That future, however, is dependent on good, long-range planning. Four important factors will have an impact on school design. First, the education program is important in both content and teaching methods to be used. Second, the community and site are important in

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[29]Kal Porter, "Imagineering Options for School Buildings of the Future," Thrust, 13 (February-March, 1984): 14-15.

[30]C. William Brubaker, "These 21 Trends Will Shape the Future of School Design," The American School Board Journal (April, 1988): 31-33.

terms of structural considerations, mechanical systems, and aesthetics. Third, education technology will affect information delivery in education. Finally, building technology will revolutionize the possibilities for building and modifying facilities. Brubaker believed that flexibility and adaptability are essential in a building design because change is the only constant in education.[31]

The literature emphasized the importance of the structure of planning itself in the development of educational specifications for an individual facility and in a school district's overall long-range planning. In an article by Graves, basic requirements for long-range planning were enumerated. Graves listed the following as those who should be involved in the process.

1. School staff members
2. Local citizens
3. Students
4. University and state educational agency personnel
5. Educational consultants
6. Architects and engineers

Graves listed the following factors that should be considered in the process:

1. Analysis of community characteristics and educational needs
2. Projected enrollment and pupil characteristics

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[31]C. William Brubaker, "Facilities Planning Outlook," American School & University, 59 (December, 1986): 28, 31.

3. Appraisal of the educational adequacy of facilities
4. Appraisal of physical and structural adequacy of facilities
5. Development of a master plan
6. Assessment of financial resources
7. Formulation of specific resources[32]

Developing technology in audiovisual materials and equipment calls for adaptable facility spaces. Kerstetter offered guidelines considered important to facilitate planning for school construction or remodeling.[33]

Harvard-Williams wrote that, because change is so rapid and constant, library education with regard to information systems and technology requires some basic alteration as well as facility design that provides flexible space for varying purposes.[34]

Graves identified the impact of the computer on curriculum in public schools as a primary trend to be considered in facility planning. A not uncommon uncertainty, according to Graves, concerns the kind of facility design that will be best-suited to computer usage. Flexibility in space configuration and electrical adequacy

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[32]Ben E. Graves, "Seven Steps Toward a Long-Range Plan," American School & University, 55 (April, 1983): 8.

[33]John P. Kerstetter, "Designing Classrooms for the Use of Instructional Media: A Planning and Specification Checklist," Media Management Journal (Fall, 1986): 25-28.

[34]Peter Harvard-Williams, "Looking Towards the Future: An Overview," Education for Information, 5 (September, 1987): 92-104.

are, in Grave's view, most important in facility design, and the need calls for proactive leadership in planning for the future.[35]

Assessment of Existing Facilities

Hawkins and Lilley wrote that the appraisal process is essential in determining whether a structure is obsolete and whether it should be renovated or abandoned. The categories for consideration in assessment, as listed by Hawkins and Lilley, were those identified by other writers as key areas for consideration in the production of an educational specifications document. They included evaluation of adequacy of spaces for the educational program, aesthetic environment, building safety, structural and mechanical features, adequacy of the site, and plant maintainability.[36]

Jilk wrote that in assessing facilities, both current and future needs should be identified in order to use resources effectively and maintain investment in educational facilities. Long-range planning is called for in both new construction and renovation of older structures. Jilk, an architect, believed that the important considerations in designing a new building include cost, aesthetics, flexibility through modular interior spaces, possible multiple uses for the structure, and shifting population. Renovating older structures,

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[35]Ben E. Graves, "Facility Planning," American School & University, 54 (June, 1982): 12-14.

[36]Harold L. Hawkins and H. Edward Lilley, Guide for School Facility Appraisal (Columbus, Ohio: Council of Educational Facility Planners, 1986), p. 1.

Jilk claimed, is often a sound decision if the cost does not exceed 50 percent of the cost of new construction. He noted that careful consideration must be given to the same concerns as in designing a new facility.[37]

Decision Making in Construction versus Modernization

The choice between constructing a new facility and modernizing an old one is not a simple one, but the literature tied the quality of the decision-making process to the quality and extent of long-range planning overall. Day wrote that increased attention has been given to assessing utilization, maintenance, modernization, and energy costs of school facilities. The cost of these and the resultant impact on taxation have stirred public concern. In the 1950s and 1960s, considerable funds were put into new facilities to the neglect of older buildings. At the present time, there are problems in those older structures, and necessary capital funds are hard to come by. According to Day, the modernization of a building may involve any of three processes: rehabilitation, to restore it to good condition; remodeling, to make it over; or face-lifting, to improve appearance with superficial changes. A critical choice in many cases, Day said, is between modernization and replacement. Questions that must be asked in making the decision include the following. Does modernization fit into the long-range plan of the district? Can the existing

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[37]Bruce A. Jilk, "Designing Schools for Changing Needs," Education Digest, 53 (November, 1987): 12-13.

facility be modernized to meet current and future educational needs? Are proposed changes in the structure economically and educationally feasible? Can the site be enlarged if necessary? Would a building addition be at a place where it would be effectively functional? What is the estimated prolongation, in years, of the life of the building? What is the cost per pupil per year of modernization versus replacement? In which direction does community support lean? Day noted that the option of modernization is often the one selected. In 1985, 50 percent of all school construction dollars spent went into additions to and modernization of existing facilities. Districts should not wait for major problems to develop before evaluating all buildings for needed modernization in terms of useful life and educational environments.[38]

Castaldi wrote that the choice between altering an old school facility and replacing it with a new facility is not a simple one. Castaldi identified three distinct ways of altering the old. Rehabilitation restores the building to its original condition. Remodeling restores the building but also changes, in size and shape, some of the interior spaces. Modernization, as the third option, brings the facility up-to-date structurally, educationally, and environmentally. The last of the three, modernization, Castaldi noted, is much more far-reaching and is the only option that can accommodate modern educational practices. Castaldi believed modernization is a more

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[38]Day, pp. 203-219.

complex and time-consuming project than planning a new facility. He noted that when the choice is to be between modernization of an old facility or its replacement, there are many things that must be considered. Frequently, the public favors modernization because of assumed lower cost or a sentimental attachment to the old building. The public may not be aware that the old structure is obsolete and cannot be made efficient or cost-effective. In determining whether or not to modernize, the Castaldi Generalized Formula for Modernization was recommended. The formula is based on the rate-of-depreciation of the structure. The formula adds the cost for educational improvements to the cost for both health and safety improvements and divides the sum by a figure obtained by multiplying an index of educational adequacy by the estimated life of the modernized buiding. Castaldi identified many factors that go into determining the index of educational adequacy. One key factor, for example, is the adequacy of the size of the school site. The result obtained from using the Castaldi formula should be compared to the cost of replacing the facility divided by the life of the new building.[39]

Deering and Kinder wrote that, although the current trend in public schools is a decline in enrollment, experts say that trend will level out and reverse itself over the next few years. Deering and Kinder claimed that the choice between construction and renovation will be an increasingly important one. The first determination

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[39]Castaldi, pp. 371, 377-85.

that is required relates to the adequacy of the site of the existing building. Beyond that, extensive study must be given to whether or not the facility can be adequately and cost-effectively modernized to meet the needs of current programs and projected trends in program change. A building must be modernized, not simply restored. Deering and Kinder recommended, as a first step in the evaluative process, the creation of criteria for measuring the structural soundness and educational potential of a facility. In the process, the cost of renovation should be compared to the cost of new construction. The authors presented a list of evaluative criteria developed by the American Association of School Administrators for the purpose of determining the feasibility of renovation. These criteria are as follows:

1. Original blueprints (masked conditions)
2. Architectural characteristics (design and layout)
3. Material integrity (quality and appearance)
4. Educational adequacy (programs and enrollment)
5. Codes (building, fire/safety, other regulatory)
6. Structural adequacy (weight stress, deterioration)
7. Mechanical adequacy (plumbing, heating, air conditioning, ventilation)
8. Electrical adequacy (outlets, power supply, defective wires[40]

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[40]Thomas E. Deering and Paul A. Kinder, "That Aging School Building: Weight These Eight Factors before Bringing in the Wrecking Ball," American School Board Journal, 169 (May, 1982): 28-29.

Several authors noted that new construction is not as common now as it was in years past when accommodation for the baby boomers was a concern. With the opportunity to create new facilities being relatively rare, full and careful planning is more important than ever according to Smith, Stevenson, and Pellicer. Their description of the process followed by the Elloree Public Schools (K-12; enrollment, 790) in Orangeburg County, South Carolina included nine steps. Neither the Elloree school board nor the administration had any experience with construction projects. Advice was sought from state and federal agencies and the state university. The process followed included the following steps:

1. Visits to recently completed school buildings in other districts and discussion with board members of those districts
2. The hiring of a consultant (in this case, a faculty member at the University of South Carolina) knowledgeable about school construction
3. Defining goals and educational program needs
4. Development of a management plan for the project
5. Creation of a project description
6. Identification of prospective architects
7. Deciding on specific professional information to be required of competing architectural firms
8. Rating the architectural firms
9. Soliciting presentations from the top three architectural firms[41]

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[41]Ellison Smith, Kenneth R. Stevenson, and Leonard O. Pellicer, "Follow These Nine Steps to Select the Architectural Firm that Can Design a New School According to Your Exact Specifications," The American School Board Journal, 171 (May, 1984): 36-37.

Mutter and Nichols believed long-range planning through constant collection and analysis of building information is essential to a successful facility renewal plan. In addressing the problem of deteriorating school buildings, Mutter and Nichols noted that a recent estimate of necessary repairs on schools across the country was in excess of $25 billion. The authors cited the rapid building boom of the 1950s and 1960s and the sometimes less than satisfactory building techniques, as well as budget reductions in recent years, as contributing factors in the deterioration of physical plants nationwide. They emphasized the need to begin immediately to salvage the investment in school facilities because of the age and condition of many structures and because to delay will mean paying a higher price later. The authors identified as important areas of concern some of the same information categories recommended throughout the literature for inclusion in educational specifications documents: mechnical systems, learning environment, safety, site conditions, landscaping, and aesthetic considerations.[42]

Summary

Most of the literature on school facility planning was not found in research journals. The literature was strong and progressive in its content but was not based on specific research data. The key

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[42]Davida W. Mutter and W. Randolph Nichols, "What Do We Fix First? A Step-by-Step Plan for an Inhouse Maintenance Audit of School Buildings," CEFP Journal, 25 (July-August, 1987): 6-9.

concepts contained in the literature on school facility design were based on an awareness of change and the increasing rapidity of change. Flexibility was repeatedly called for in school design in order to meet future needs for modifications that would be both relatively easy and cost-effective. The information explosion and technological developments were identified as fundamental to curriculum trends in all subject areas. Planning, both short- and long-range, was seen as essential in meeting school facility needs. The literature repeatedly emphasized the need to anticipate trends and the inevitability of change. Communication between educators (who must anticipate curriculum trends) and architects (who must design for those trends) was stressed as a crucial element in the planning process. The importance of educational specifications documents that are characterized by thoroughness, clarity, and purposeful organization was readily apparent as authors referred to such documents as the means of that communication.

CHAPTER III

METHODOLOGY

Introduction

The literature on school facility planning contained material on the purpose of educational specifications and their importance to adequate school facility design, as well as the advocacy of a proactive approach at the state level to facility design. No specific research was found, however, related to school building staff perceptions of facility adequacy where state guidelines for educational specifications existed. The purpose of this study was to provide some initial research in that area. The research hypothesis tested by this study was that high school classroom teachers would have a significantly more positive opinion of the adequacy of their schools' facilities in states that required the use of state-adopted educational specifications guidelines than those in states without such requirements.

Subjects

The subjects for this study were classroom teachers in selected urban high schools that had been constructed or modernized within the last two to twenty-six years. The sample of subjects selected for this study was drawn from metropolitan statistical areas in six states; three states had state guidelines for educational specifications in planning school facility construction or modernization, and

three states had no guidelines for educational specifications. The total sample for the study consisted of 113 high school classroom teachers. Of that number, 40 were from states with state guidelines for educational specifications, and 73 were from states without state guidelines.

Preliminary identification of states that had or did not have state guidelines for educational specifications was made by referring to the 1987 American Institute of Architects' State Requirements Survey for School Construction K-12.[1] A state was assumed to have no state guidelines if the above survey document identified it as having no early planning requirements in the areas of (1) state pre-planning agencies, (2) mandated community involvement, or (3) state planning review. A state was assumed to possibly have state guidelines for educational specifications if the above survey report identified it as having early planning requirements in at least two of the three areas listed above.

Based on the 1987 American Institute of Architects' survey,[2] a letter was sent to officials in the state department of education in each of the 17 states that appeared most likely to have state guidelines for educational specifications. The letter requested a copy of the guidelines for school-house educational specifications that

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[1]Committee on Architecture for Education, State Requirements Survey for School Construction K-12 (New York: American Institute of Architects, 1987), n.p.

[2]Committee on Architecture for Education, n.p.

were used in that state and for information on how long the guidelines had been in place. The 17 states were:

Alaska
Connecticut
Delaware
Florida
Georgia
Hawaii
Illinois
Maine
Massachusetts
Michigan
Minnesota
Mississippi
New Jersey
Ohio
Oklahoma
South Dakota
Utah

Facility planning information was received from officials in 14 of the above states; no response was received from Delaware or Massachusetts officials. Hawaii officials replied that the voluminous nature of its guidelines and the cost of reproducing them precluded their being able to send a copy.

Of the material received representing conditions in 14 states, only five had detailed guidelines for developing educational specifications for school-house construction and modernization in place long enough to be applicable to this survey. Those states were Alaska, Connecticut, Maine, New Jersey, and Ohio. Guidelines for educational specifications in these states identified the purpose, organization, and content of educational specifications. They set forth relevant information on background information, population, educational program, auxiliary service, physical environment, and future modification concerns to be included in the development of educational specifications documents as well as appropriate participants to be involved in that development.

Based on the same 1987 American Institute of Architects' survey,[3] 12 states were selected that appeared unlikely to have state guidelines for educational specifications for facility design. The 12 states were:

Colorado	Nebraska
Indiana	New Hampshire
Iowa	Oregon
Kansas	Virginia
Missouri	Wisconin
Montana	Wyoming

The states of Indiana, Iowa, Kansas, Missouri, Nebraska, and Wisconsin were selected because of the researcher's interest in the midwest and because of their geographic relationship to Ohio, one of the states with guidelines. Colorado, Montana, Oregon, and Wyoming were selected as possible western representatives and because Montana and Wyoming had relatively sparse populations, as did Alaska, one of the states with guidelines. New Hampshire and Virginia were selected because of their relatively close geographic location to Connecticut, Maine, and New Jersey.

A letter was sent to the state department of education in each of the above 12 states requesting a copy of the guidelines, if any, for schoolhouse educational specifications that were used in the state (Nebraska contacts with state and district officials were made by phone). Information was received from all 12 states. With the exception of New Hampshire, none of the states had detailed guidelines for educational specifications. Some of the materials indicated

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[3]Committee on Architecture for Education, n.p.

that educational specifications should be developed for construction or modernization projects, but noted that clearly defined guidelines for that development were not put forward. The materials from these states included safety codes, square footage allotments, mechanical codes/recommendations, and funding regulations.

Based on responses received from personnel in the selected state departments of education, the states were categorized as follows relative to their having adopted mandated guidelines for developing educational specifications documents to be used in schoolhouse construction and modernization.

States with Guidelines (6)	States without Guidelines (20)	
Alaska	Colorado	Missouri
Connecticut	Florida	Montana
Maine	Georgia	Nebraska
New Hampshire	Illinois	Oklahoma
New Jersey	Indiana	Oregon
Ohio	Iowa	South Dakota
	Kansas	Utah
	Michigan	Virginia
	Minnesota	Wisconsin
	Mississippi	Wyoming

Officials in the Metropolitan Area Planning Agency in Omaha, Nebraska, provided information on urban classifications and the name of a contact person at the regional office of the Bureau of the Census in Denver, Colorado. The contact person provided a copy of the metropolitan statistical areas as defined by the Office of Management and Budget as of June 30, 1989.[4] Metropolitan statistical

[4]U.S., Bureau of the Census, United States Department of Commerce News (Washington, D.C.: Government Printing Office, September 8, 1989), n.p.

areas for the 26 states that had responded to the original request for copies of school planning materials were determined from this document.

A request was sent to the state department of education in each of the 26 states (6 with guidelines, 20 without) for the names of contact persons in school districts within the selected MSA communities in that state. The request district contact persons' names were supplied by 16 states as follows:

States with Guidelines (4)	States without Guidelines (12)	
Alaska	Illinois	Oklahoma
Maine	Kansas	Oregon
New Hampshire	Michigan	Utah
New Jersey	Minnesota	Virginia
	Missouri	Wisconsin
	Nebraska	Wyoming

A request was then sent to the identified district contact persons in MSAs in the above 16 states for a list of high schools in their districts that were constructed or modernized within the last two to twenty-six years. The school addresses and principals' names of any such schools were also requested. Replies were received from people in all 16 states, with one to twenty-two districts per state responding. Adequate information regarding the extent and dates of construction or modernization, complete addresses of schools, and whether or not the school(s) listed was a high school was not provided in all of the responses. In some cases, construction was ongoing and, in some, no new construction or modernization had actually taken place in the past 26 years. States eliminated at this stage for one

or more of the above reasons were:

Illinois
Michigan
Minnesota
Missouri
Oklahoma
Oregon
Utah

The states remaining to be surveyed were as follows:

States with Guidelines (4)	States without Guidelines (5)
Alaska	Kansas
Maine	Nebraska
New Hampshire	Wisconsin
New Jersey	Wyoming
	Virginia

The qualifying school districts from states with guidelines were all from what the Bureau of the Census classified as small urban (50-250 thousand) MSAs.[5] Therefore, high schools in only small urban or, at most, urban (250 thousand-one million) classifications were selected from states without guidelines. Large urban (over one million) MSAs were eliminated.

Instrumentation

The design of this study was survey research. The survey instrument used was a questionnaire on school facility educational adequacy and environment. The instrument included the following categories for rating a school facility: (1) Location and Site;

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[5]U.S., Bureau of the Census, n.p.

(2) Structureal, Mechanical, Electrical, Maintenance Features; (3) Educational Adequacy in Academic, Special, and Support Areas; and (4) Environment.

The questionnaire was modeled after the Appraisal Guide for High School Facilities, developed by Hawkins and Lilley.[6] The instrument used a strongly agree to strongly diasgree rating scale on statements of adequacy. The questionnaire was juried by the dissertation committee chair and by ten high school classroom teachers from the areas of science, mathematics, social studies, art, physical education, home economics, English, theater, business education, and foreign langauge. Three or four suggestions regarding clarification of specific items were received from the jury, and those adjustments were made (see Appendix A for a copy of the questionnaire).

Procedure

In January, 1991, principals at eight high schools in Alaska (4), Maine (1), New Hampshire (2), and New Jersey (1) were each sent 25 copies of the questionnaire with a letter briefly explaining the study and requesting participation of classroom teachers in the survey. The questionnaires were completed and returned from two of the eight schools (one school in Alaska and one school in New Jersey).

A follow-up letter was sent to the schools in Alaska (3),

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[6]Harold L. Hawkins and H. Edward Lilley, Guide for School Facility Appraisal (Columbus, Ohio: Council of Educational Facility Planners, 1986), pp. 67-68.

Maine (1), and New Hampshire (2) (see Appendix B for copies of correspondence). One New Hampshire school requested a second set of questionnaires, and those were sent in March, 1991. Questionnaires in the second set were completed and returned from the New Hampshire school.

Principals at 22 high schools in Kansas (6), Nebraska (3), Virginia (3), Wisconsin (6), and Wyoming (4) were sent 25 copies of the questionnaire with a letter briefly explaining the study and requesting participation of classroom teachers in the survey. The questionnaires were completed and returned from 11 of the 22 schools (two each from Kansas, Nebraska, Virginia, and Wyoming; three from Wisconsin).

The questionnaires from Virginia were not returned until after the analysis of data had been completed. The questionnaires from Wyoming were eliminated due to incomplete responses in one set and the inclusion of student responses in the other. The questionnaires from two of the Wisconsin schools were eliminated due to incomplete responses.

The subsequent analysis of data was based on survey responses from high school classroom teachers, as shown in Table 1.

TABLE 1

Survey Responses from Classroom Teachers

State	MSA	Number of Schools	Number of Respondents
States with Guidelines			
Alaska	Anchorage (218,500)	1	5
New Hampshire	Dover (220,400) (Portsmouth-Dover-Rochester)	1	23
New Jersey	Seabrook (138,400) (Vineland-Millville-Seabrook-Bridgeton)	1	12
States without Guidelines			
Kansas	Wichita (483,100)	2	25
Nebraska	Omaha (621,600) (Omaha, NE-Iowa)	1	15
	Lincoln (211,600)	1	15
Wisconsin	Eau Claire (138,400)	1	18

CHAPTER IV

DATA ANALYSIS

Introduction

The purpose of this study was to determine if high school classroom teachers would have a significantly more positive opinion of the adequacy of their schools' facilities in states that required the use of state-adopted educational specifications guidelines than those in states without such guidelines.

The design of the study was survey research. The survey instrument used was a questionnaire on school facility educational adequacy and environment. The questionnaire included the following categories for rating a school facility: (1) Location and Site; (2) Structural, Mechanical, Electrical, Maintenance Features; (3) Educational Adequacy in Academic, Special, and Support Areas; and (4) Environment. The questionnaire was modeled after the Appraisal Guide for High School Facilities developed by Hawkins and Lilley.[1] The instrument used a strongly agree to strongly disagree rating scale on statements of adequacy (see Appendix A for a copy of the questionnaire).

The survey instrument was mailed to principals at eight high schools in four states that required the use of state-adopted

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[1]Harold L. Hawkins and H. Edward Lilley, Guide for School Facility Appraisal (Columbus, Ohio: Council of Educational Facility Planners, 1986), pp. 67-68.

educational specifications guidelines and to principals of 22 high schools in five states that did not have such a requirement. Each principal received 25 copies of the questionnaire and a letter requesting the participation of classroom teachers in the survey.

Properly completed questionnaires were received in time to be included in the data analysis from a total of 113 high school classroom teachers from eight high schools in six states. The survey respondents by states with or without guidelines and the MSAs are identified in Table 2.

Hypotheses

The research hypothesis for this study was: High school classroom teachers have a significantly more positive opinion of the adequacy of their schools' facilities in states that require the use of state-adopted educational specifications guidelines than do those in states without such requirements.

In order to test the research hypothesis, the following statistical hypotheses were formulated:

Null hypothesis (H_0): There is no difference at the .05 level of significance in the mean scores on a facility adequacy rating scale of urban high school classroom teachers in states with guidelines for the development of educational specifications for school facility construction and modernization and the mean scores of urban high school classroom teachers in states without guidelines.

Alternate hypothesis (H_a): The mean scores on a facility adequacy rating scale of urban high school classroom teachers in states

TABLE 2

Number of Classroom Teachers Responding to the Questionnaire

State	MSA	Number of Schools	Number of Respondents
States with Guidelines			
Alaska	Anchorage (218,500)	1	5
New Hampshire	Dover (220,400) (Portsmouth-Dover-Rochester)	1	23
New Jersey	Seabrook (138,400) (Vineland-Millville-Seabrook-Bridgeton)	1	12
States without Guidelines			
Kansas	Wichita (483,100)	2	25
Nebraska	Omaha (621,600) (Omaha, NE-Iowa)	1	15
	Lincoln (211,600)	1	15
Wisconsin	Eau Claire (138,400)	1	18

with guidelines for the development of educational specifications are significantly greater at the .05 level than the mean scores of urban high school classroom teachers in states without guidelines.

Statistical Test

The research required subjective ratings on a numerical scale. The numbers in the scale have no real meaning. Such numbers that

express preference or rank are symbols conveying order. They belong to an ordinal scale and, for ordinal data, nonparametric tests are often the most powerful.[2] The distance between the values has no inherent meaning, and standard arithmetic operations are not consistent when applied to ordinal numbers.[3] For such research, nonparametric tests are appropriate.[4]

The nonparametric Wilcoxon Matched-Pairs Signed-Ranks test was used to determine the significance of any difference in the distribution of scores of the two groups surveyed. The Wilcoxon test utilizes information about the relative magnitude and directions of differences within pairs. The test is powerful because it gives more weight to a pair that shows a large difference between two conditions than to a pair that shows a small difference.

Procedure

The computer program used for data input and statistical calculations was the IBM compatible program, QuatroPro, with spreadsheet and mathematical capabilities.

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[2]W. J. Conover, Practical Nonparametric Statistics (New York: John Wiley and Sons, 1971), p. 203.

[3]Fred N. Kerlinger, Foundations of Behavioral Research (New York: Holt, Rinehart, and Winston, 1963), p. 259.

[4]Walter R. Borg and Meredith Damien Gall, Educational Resesarch: An Introduction, 4th ed. (New York: Longman, 1983), p. 559.

Returned questionnaires were divided into two groups, those from states with guidelines and those from states without guidelines. Response choices were weighted for calculation:

Response 1, Strongly Agree = 4.0

Response 2, Agree = 3.0

Response 3, Disagree = 2.0

Response 4, Strongly Disagree = 1.0

The mean of each survey question and each category of questions was found for both groups. Categories of questions were as follows:

I	Questions 1- 6	Location and Site
II	Questions 7-16	Structural, Mechanical, Electrical, Maintenance Features
III	Questions 17-49	Educational Adequacy in Academic, Special, and Support Areas
IV	Questions 50-56	Environment

Data on responses to each question on the survey questionnaire and weighted calculated means by question for states with guidelines are shown in Table C-1 in Appendix C. Similar data for states without guidelines are shown in Table C-2 in Appendix C. The mean score for every question on the 56-question survey, with the exception of questions 6, 34, 45, 50, 51, and 52, was higher in states with guidelines than in states without. The data are illustrated in the following bar graphs in categories as they were grouped within the questionnaire.

Analysis of Categorical Groups

The differences in means per question in Category I: Location and Site are illustrated in Figure 1. The mean for every question, with the exception of question 6, was higher for states with guidelines than for states without. Question 6 in Category I referred to adequate parking space for athletic competitions. Question 2, which referred to the adequacy of campus size in meeting all present educational needs, showed the greatest spread between mean response scores in the Location and Site category. The second greatest spread was in the mean response scores for Question 4, which referred to the suitability of the campus for special instructional needs such as outdoor learning laboratories in science or outdoor drawing classes in art.

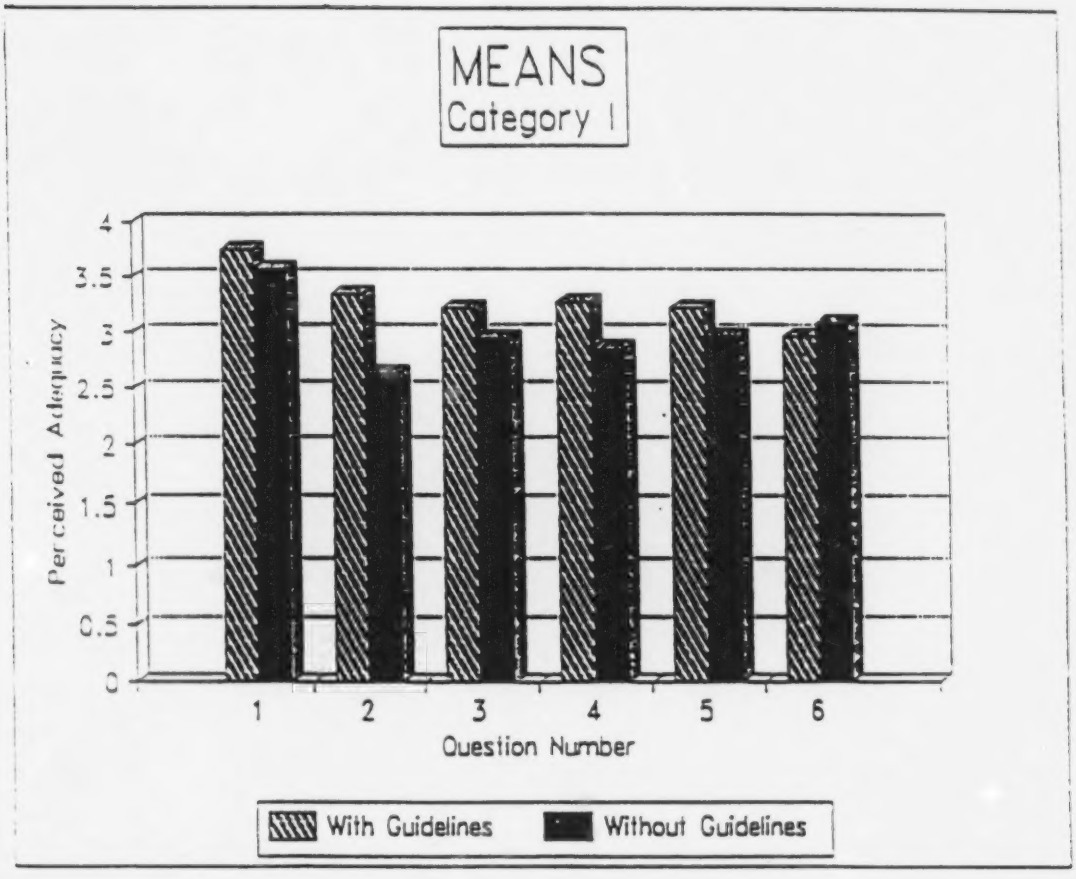

FIGURE 1

Comparison of Means for Survey Questions 1-6 on Location and Site in States with and without Guidelines

The differences in means per question in Category II: Structural, Mechanical, Electrical, Maintenance Features are illustrated in Figure 2.

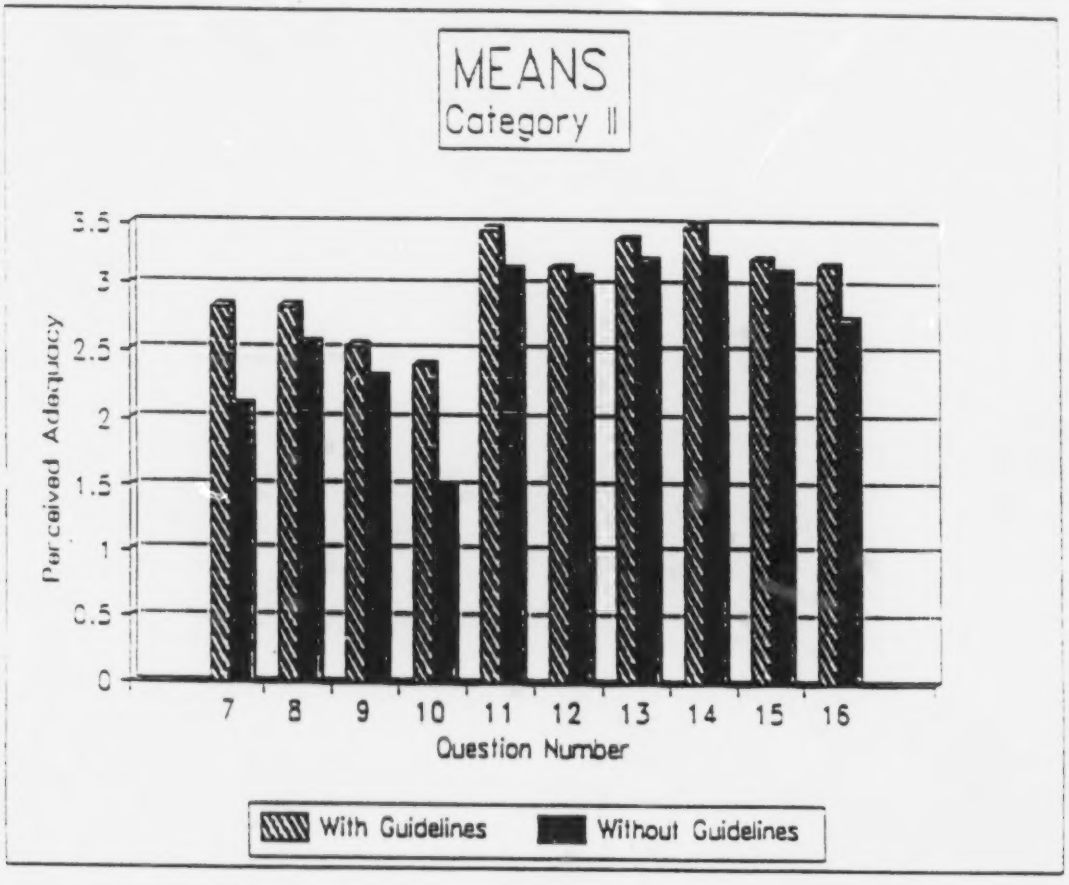

FIGURE 2

Comparison of Means for Survey Questions 7-16 on Structural, Mechanical, Electrical, Maintenance Features in States with and without Guidelines

The mean score for every question in Category II was higher for states with guidelines than for states without. The greatest spreads between mean response scores were for questions 7, 10, 11, and 16, which referred to flexible space for variety of class size, efficiency of air conditioning, adequacy of electrical power supply, and ease of maintenance of built-in equipment, respectively.

The differences in means per question in Category III: Educational Adequacy in Academic, Special, and Support Areas are shown in Figues 3 and 4.

The mean for every question, with the exception of numbers 34 and 45, was higher for states with guidelines than for states without. Question 34 referred to adequacy of space for the art program and equipment. Question 45 referred to adequate privacy in counselors' offices. While the mean scores for questions 34 and 45 were lower in states with guidelines, the differences in those mean scores were the lowest of any on the questionnaire. Of all of the other questions in Category III, questions 17, 18, 19, 24, 43, and 44 showed the greatest spread between mean response scores. Those six questions referred to adequacy of size, design, flexibility, and technical system in learning areas for academic subjects as well as special subjects in addition to art, such as home economics, business education, shop, and stagecraft.

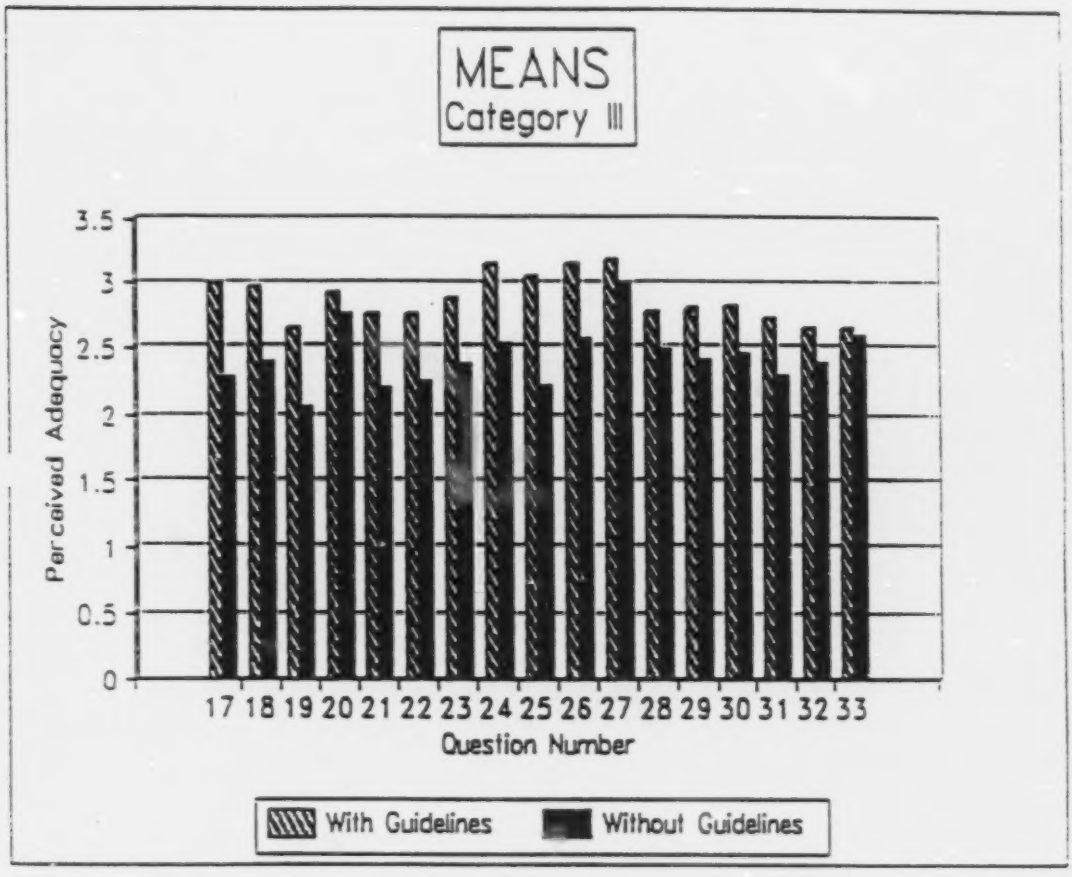

FIGURE 3

Comparison of Means for Survey Questions 17-33 on Educational Adequacy in Academic, Special, and Support Areas in States with and without Guidelines

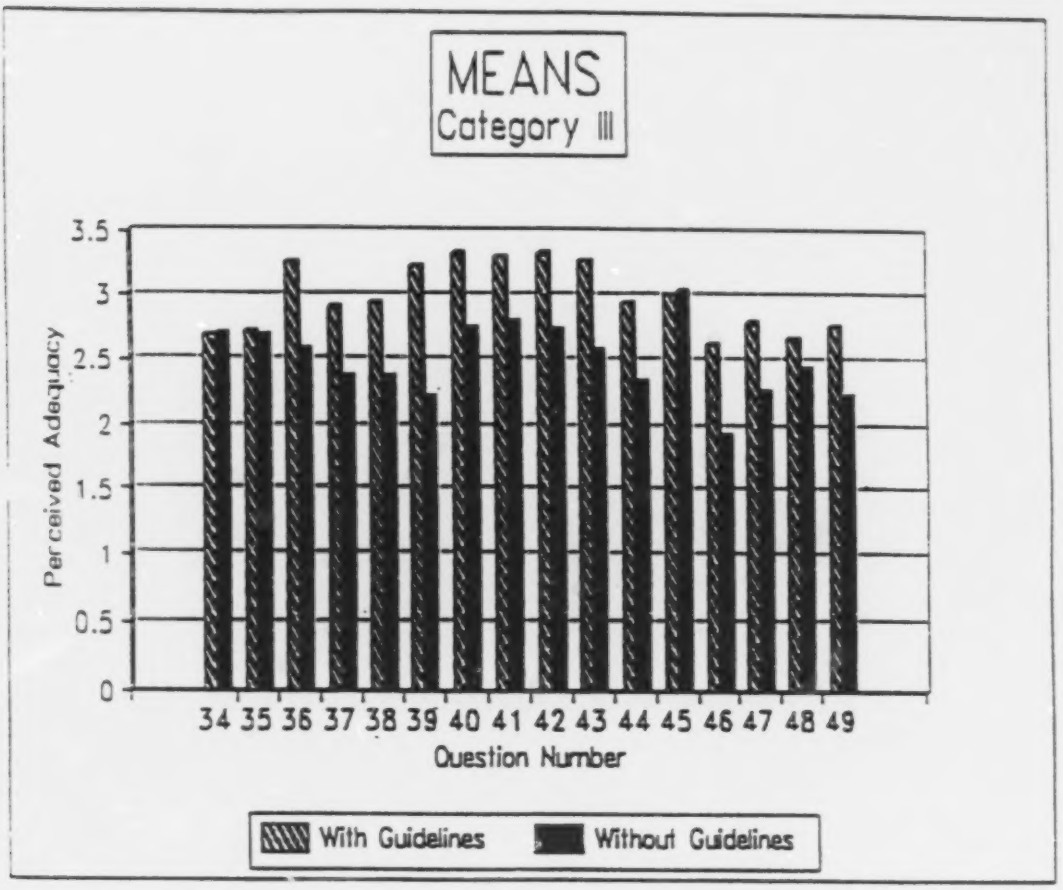

FIGURE 4

Comparison of Means for Survey Questions 34-49 on Educational Adequacy in Academic, Special, and Support Areas in States with and without Guidelines

The differences in means per question in Category IV: Environment are illustrated in Figure 5.

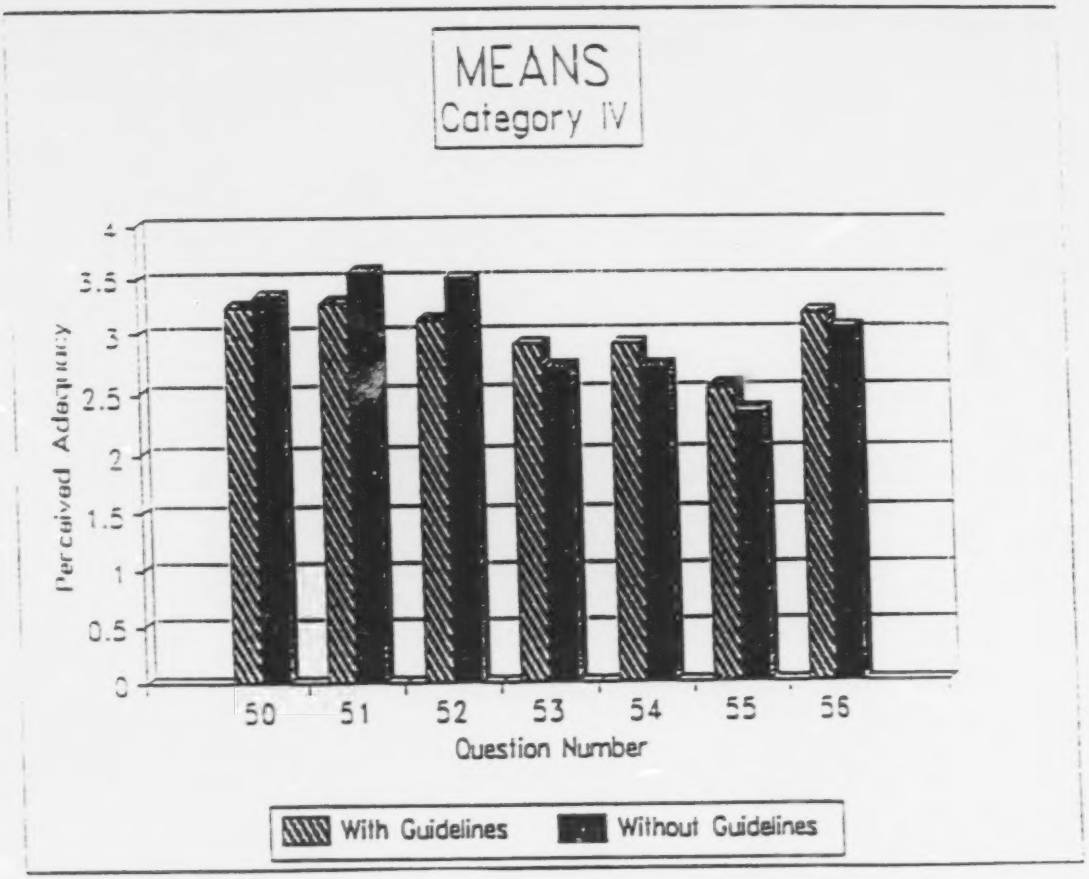

FIGURE 5

Comparison of Means for Survey Questions 50-56 on Environment in States with and without Guidelines

The mean for every question, with the exception of numbers 50, 51, and 52, was higher for states with guidelines than for states without. Question 50 in Category IV referred to the quality of landscaping. Question 51 referred to the attractiveness of the exterior building color and texture. Question 52 referred to the aesthetic quality of the overall exterior design of the building. Means scores were collectively highest on the qualities of external building attractiveness and design, while the means scores were lowest in the area of internal environment, in particular, question 55, which referred to freedom from exterior noise.

Data on weighted calculated means by questionnaire category are shown in Table 3.

TABLE 3

Weighted Calculated Means by Questionnaire Category in States with Guidelines for Development of Educational Specifications Documents and States without Guidelines

	Questionnaire Category	Category Mean	
		States with Guidelines	States without Guidelines
I	Location and Site	3.3000	3.0154
II	Structural, Mechanical, Electrical, Maintenance Features	3.0425	2.6921
III	Educational Adequacy in Academic, Special, and Support Areas	2.9295	2.4601
IV	Environment	3.0214	3.0244

The mean for every category except Category IV, Environment, was higher in states with guidelines than in states without. Agreement with facility adequacy was weighted Strongly Agree = 4.0; Agree = 3.0; Disagree = 2.0; and Strongly Disagree = 1.0.

Analysis of Individual Questions

The Wilcoxon Matched-Pairs Signed-Ranks test was performed on each question pair to determine if the level of perceived adequacy differed significantly between the states with guidelines and the states without guidelines. The mean for each question from states with guidelines was paired with the mean for each question from states without guidelines. For each matched pair, the difference in means was determined. The matched question pairs were ranked by the size of the difference in means without respect to sign (+ or -). For a tie, average rank was assigned. The sign (+ or -) of the difference within each pair was affixed to each rank. The sign + was affixed to every difference where the question mean was higher in states with guidelines and the sign - was affixed to every difference where the question mean was lower in states with guidelines. The matched pairs sign ranks for all question means are shown in Table 4. Differences that were negative (-) are so indicated. All other differences were positive.

If the ranks having positive (+) signs are summed and those having negative (-) signs are summed, the two sums could be expected to be equal if the null hypothesis (H_0) were true. The two sums were

TABLE 4

Wilcoxon Matched-Pairs Signed-Ranks Test Mean Differences by Question in States with Guidelines for Developing Educational Specifications Documents and States without Guidelines

Question Number	Question Mean		Difference in Means	Rank of Difference
	States with Guidelines	States without Guidelines		
34	2.70	2.71	-0.01053	1.0
45	3.00	3.03	-0.02632	2.0
35	2.73	2.70	0.02763	3.0
33	2.65	2.58	0.07105	4.0
12	3.15	3.07	0.08421	5.0
50	3.25	3.34	-0.09211	6.0
6	2.98	3.09	-0.11711	7.0
15	3.23	3.11	0.11974	8.0
56	3.18	3.04	0.13553	9.0
20	2.93	2.76	0.16184	10.5
27	3.18	3.01	0.16184	10.5
1	3.75	3.58	0.17105	12.0
13	3.38	3.20	0.17763	13.0
55	2.53	2.33	0.19605	14.0
54	2.90	2.70	0.20263	15.5
53	2.90	2.70	0.20263	15.5
9	2.63	2.30	0.22237	17.0
48	2.68	2.45	0.22763	18.0
14	3.48	3.22	0.25132	19.5
5	3.23	2.97	0.25132	19.5
32	2.65	2.38	0.26842	21.0
8	2.83	2.55	0.27237	22.0
3	3.23	2.95	0.27763	23.0
51	3.28	3.57	-0.29079	24.0
28	2.78	2.47	0.30132	25.0
11	3.45	3.13	0.31842	26.0
52	3.13	3.50	-0.37500	27.0
30	2.83	2.43	0.39079	28.0
29	2.80	2.39	0.40526	29.0
4	3.28	2.86	0.41974	30.0
31	2.73	2.29	0.43553	31.0
16	3.18	2.74	0.43816	32.0
41	3.30	2.80	0.49737	33.0
23	2.88	2.37	0.50658	34.0
22	2.75	2.24	0.51316	35.0
37	2.90	2.37	0.53158	36.0
47	2.80	2.25	0.55000	37.0

TABLE 4 (continued)

Question Number	Question Mean: States with Guidelines	Question Mean: States without Guidelines	Difference in Means	Rank of Difference
49	2.79	2.22	0.55132	38.0
21	2.75	2.20	0.55263	39.0
40	3.33	2.76	0.56183	40.0
38	2.95	2.37	0.58158	41.0
42	3.33	2.74	0.58816	42.0
18	2.98	2.38	0.59342	43.0
19	2.65	2.05	0.59737	44.0
26	3.15	2.55	0.59737	45.0
44	2.95	2.34	0.60789	46.0
24	3.15	2.53	0.62368	47.0
36	3.25	2.59	0.65789	48.0
43	3.28	2.59	0.68289	49.0
46	2.63	1.92	0.70395	50.0
2	3.35	2.64	0.70526	51.0
7	2.83	2.11	0.71974	52.0
17	3.00	2.28	0.72368	53.0
25	3.05	2.21	0.83947	54.0
10	2.40	1.50	0.90000	55.0
39	3.23	2.21	1.01447	56.0

not equal, and the smaller of the sums of the like-signed ranks (T) was determined. In this study, T represented the sum of the ranks whose differences were negative, those questions showing higher perceived adequacy by states without guidelines.

The number (N) of matched-pair question means showing no difference (non-zero differences) was determined. There were no non-zero differences. Because N was larger than 25, the value of z was computed. The associated probability under H_0 was determined by referring to the Normal Table. Where the probability (p) obtained was equal to or less than alpha (α), H_0 was rejected in favor of H_a. The probability obtained for each category on the questionnaire and for the total questionnaire is shown in Table 5.

TABLE 5

Probabilities Obtained for Each Category on Questionnaire and for Total Questionnaire

Questionnaire Category		z	p	α	Accept/Reject H_0
I	Location and Site	-1.9917	.0233	.05	$p < \alpha$ -- Reject H_0
II	Structural, Mechanical, Electrical, Maintenance Features	-2.8030	.0026	.05	$p < \alpha$ -- Reject H_0
III	Educational Adequacy in Academic, Special, and Support Areas	-4.9580	Ø	.05	$p < \alpha$ -- Reject H_0
IV	Environment	Ø	.5000	.05	$p > \alpha$ -- Accept H_0
	Total Questionnaire	-6.0000	Ø	.05	$p < \alpha$ -- Reject H_0

Summary

The null hypothesis formulated for this study stated there is no difference at the .05 level of significance in the mean scores on a facility rating scale of urban high school classroom teachers in states with guidelines for the development of educational specifications for school facility construction and modernization and the mean scores of urban high school classroom teachers in states without guidelines.

The data collected and analyzed using the Wilcoxon Matched-Pairs Signed-Ranks test resulted in the rejection of the null hypothesis in relation to three of the four categories on the facility adequacy questionnaire as well as rejection of the null hypothesis in relation to the questionnaire as a whole. The differences found in mean scores between states with and without guidelines were found to be significant at the .05 level.

The results of the analysis support the acceptance of the alternative hypothesis formulated for this study that the mean scores on a facility adequacy rating scale of urban high school classroom teachers in states with guidelines for the development of educational specifications are significantly greater at the .05 level than the mean scores of urban high school classroom teachers in states without guidelines.

CHAPTER V

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

The purpose of this study was to determine if, in the opinion of selected classroom taechers, the required use of state-adopted educational specifications guidelines when constructing or modernizing urban high school facilities had resulted in more adequate housing for programs than the adequacy perceived by classroom teachers in newly constructed or modernized urban school facilities in states without required use of such guidelines. The adequacy of public school facilities is important in relation to the efficient daily function of the program and to curriculum change affected by developing technology and increasingly sophisticated processes of information delivery.

A review of the literature on the role of educational specifications documents in school facility construction and modernization revealed no research studies on the topic. The review did, however, provide considerable reference to the importance of educational specifications documents in school construction and modernization.

In only a few states were detailed guidelines provided for educational specifications to be used in school building construction and modernization. Some other states indicated to local districts

that educational specifications documents were necessary, but provided no detailed guidelines for their development. The majority of states provided information on square footage allotments. Finally, there were some states that left all planning and regulations for new or modernized school buildings to the local communities.

Research Hypothesis

The research hypothesis for this study was: High school classroom teachers have a significantly more positive opinion of the adequacy of their school's facilities in states that require the use of state-adopted educational specifications guidelines than do those in states without such requirements.

The statistical hypotheses formulated for this study were as follows:

Null hypothesis (H_0). There is no difference, at the .05 level of significance, in the mean scores on a facility adequacy rating scale of urban high school classroom teachers in states with guidelines for the dvelopment of educational specifications for school facility construction and modernization and the mean scores of urban high school classroom teachers in states without guidelines.

Alternate hypothesis (H_a): The mean scores on a facility adequacy rating scale of urban high school classroom teachers in states with guidelines for the development of educational specifications are significantly greater at the .05 level than the mean scores of urban high school classroom teachers in states without guidelines.

The design of the study was survey research using a facility adequacy questionnaire with questions related to location and site, structural/mechnical/electrical/maintenance features, educational adequacy in academic/special/support areas, and environment. The statistical test used was the Wilcoxon Matched-Pairs Signed-Ranks test.

Findings

Findings from the Literature

The specific findings relative to the review of the literature in this study were:

1. Authors reported what appeared to be a steady increase in awareness of the importance of the school facility in the success of a school.

2. Educational specifications documents were described as essential to a process in which eductors clarify needs and architects respond successfully to those needs. Written educational specifications are the link between the educational program and the school facility.

3. Educational specifications documents become the architect's most important guide in planning for curriculum trends, instructional change, and flexible-use space.

4. The nature and extent of state involvement in school facility contruction and modernization varied greatly. The degree of state involvement and whether the role of the state should be

advisory or regulatory was a controversial issue in the literature. Generally, the literature advocated a proactive approach at the state level for the purpose of achieving equity in school facilities.

Findings from the Survey

The specific findings relative to the survey in this study were:

1. At the .05 level of significance, classroom teachers' perceptions of overall facility adequacy were found to be higher in states with educational specifications guidelines for school-house construction than in states without such guidelines. The mean score was higher in states with guidelines on 50 of the 56 survey questions.

2. At the .05 level of significance, classroom teachers' perceptions of facility adequacy, as they pertained to location and site, were found to be higher in states with guidelines than in states without guidelines. The location and site category of the questionnaire contained six questions related to campus layout. Only question six had a higher mean in states without guidelines. Question six pertained to adequate parking for athletic competitions.

3. At the .05 level of significance, classroom teachers' perceptions of facility adequacy, as they pertained to structural, mechnical, electrical, and maintenance features, were found to be higher in states with guidelines than in states without guidelines. The structural, mechanical, electrical, maintenance category on the questionnaire contained ten questions related to efficiency in

function. Each of the ten questions had a higher mean score in states with guidelines.

4. At the .05 level of significance, classroom teachers' perceptions of facility adequacy, as they pertained to educational adequacy in academic, special, and support areas, were greater in states with guidelines than in states without guidelines. The educational adequacy in the academic, special, and support areas category on the questionnaire contained 33 questions related to instruction, curriculum, and flexible-use space. Only questions 34 and 45 had higher means in states without guidelines. Question 34 pertained to sufficient space for the art program and art equipment. Question 45 pertained to insuring privacy in counselors' offices.

5. At the .05 level of significance, classroom teachers' perceptions of facility adequacy as they pertained to environment in states with guidelines were less than or equal to teachers' perceptions of facility adequacy in states without guidelines. The environment category on the questionnaire contained seven questions related to aesthetic appearance and atmosphere. Questions 50, 51, and 52 had higher means in states without guidelines. Question 50 pertained to the landscaping of the site. Question 51 pertained to the attractiveness of the color and texture of the exterior building materials. Question 52 pertained to the aesthetic appeal of the overall exterior design of the building.

Conclusions

Conclusions from the Literature

Based on the findings of the study, the following conclusions were drawn in relation to the review of the literature:

1. Education no longer focuses on a paper-and-pencil approach to learning. To be successful in educating students, a school must function in a variety of ways, and the school facility must promote that function.

2. The joint efforts of educators, experts in program, and architects, experts in design, require the clear and thorough communication of written educational specifications.

3. Educators and architects should be guided to consider a school's function fifteen to twenty years into the future in preparing educational specifications.

4. Provisions for equity in education are in the best interests of an entire state community. The school facility has an increasingly important role in educational equity in a time of rapid technological change.

Conclusions from the Survey

Based on the findings of the study, the following conclusions were drawn in relation to the survey:

1. High school facilities are more adequate for instruction programs when constructed according to state-adopted guidelines for the development of educational specifications documents.

2. State-adopted guidelines for educational specifications when used in high school building construction will result in greater satisfaction with the location and site features of the facility.

3. State-adopted guidelines for educational specifications when used in high school building construction will result in greater satisfaction with the structural, mechanical, electrical, and maintenance features of the facility as they pertain to instructional efficiency.

4. State-adopted guidelines for educational specifications when used in high school building construction will result in a more adequate facility in flexible-use instructional space, design layout of subject areas, proximity of related areas, and provision for storage.

5. State-adopted guidelines for educational specifications when used in high school building construction will result in greater satisfaction with the environmental features of the facility that affect primarily the instructional needs of the school population. Those features that relate to only the exterior aesthetic appearance of the facility will not be affected by state-adopted guidelines.

Implications

There is strong evidence, contained in this study, that there is a major advantage in a stronger state role in the planning of high school facility construction and/or modernization. If this is true in urban and small urban areas, which perhaps have access to more

choices in resources for facility design, then such a position may certainly be true for smaller communities. Further support for this position might be gained from a state or federally financed study on a broader basis. Research sponsored at the federal level might more effectively gather data, since some states may not be able to afford such an effort and may not have an appropriate state agency to deal with such research.

This study was limited by the resources and access to the areas included in the study of the individual researcher. But the study does present evidence that state assistance in the development of school facility design offers a benefit to practitioners. Certainly, there is a long-term benefit to taxpayers if better school facilities can be constructed and maintained.

Recommendations

The expense of construction or modernization of a school is too great to waste the opportunity to make that school fully adequate for present and future use. School facility design is important to the efficient function of not only the structure but also the population housed by that structure. The first recommendation, therefore, is that further research be conducted on a broader scale and in a variety of community sizes.

The second recommendation is that state departments of education give consideration to providing guidelines for educational specifications development for school facility construction and

modernization. Those guidelines should be adequately inclusive, with information on all of the following aspects of developing educational specifications:

1. Purpose of educational specifications. Information on meeting the needs of the variety of activities and instructional areas of the school.

2. Participants. The roles of administrative, teaching, and supervisory staff; students; parents; and members of the community.

3. Population. Past, present, and projections of the school population.

4. Educational program. Needs of the current program relating to space allocations, flexibility of space, and instructional delivery systems.

5. Auxiliary services and activities. Extra-curricular needs and community use of the facility.

6. Future modification. Flexible design and choice of contruction materials to make future modifications relatively easy and cost efficient.

7. Aesthetic environment. Expanded possibilities in contemporary design no longer restricted by climate and lighting needs. Expanded possibilities for aesthetic design wedded to efficient function and supervision.

These recommendations are offered in the spirit of recognizing both the responsibility of providing functional school facilities and the opportunity for excellence in a community's approach to education.

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APPENDIX A

Questionnnaire

This three-page questionnaire was under another copyright and is not included in the ERIC document.

APPENDIX B

Correspondence

July 8, 1990

Director of Facilities
State Department of Education
Street Address
City, State Zip

To Whom It May Concern:

As a doctoral student in educational administration at the University of Nebraska-Lincoln, I am currently working on research for a dissertation in the area of school building adequacy and state guidelines for educational specifications documents for construction and renovation.

This is a request for a copy of whatever specific guidelines for schoolhouse education specifications are used in your state and for information on how long the guidelines have been in place. Enclosed is a stamped, self-addressed envelope for the return of any material you can provide. If there is a fee for such information, I will be happy to remit same. Thank you very much for your attention to this request.

Sincerely,

/s/ Antoinette E. Turnquist

Antoinette E. Turnquist
3521 Jones Street
Omaha, Nebraska 68105

September 22, 1990

Name
Director of Facilities
State Department of Education
Street Address
City, State Zip

Dear :

Thank you for your response to my earlier request regarding your state's degree of involvement with the development of educational specifications for the construction or modernization of public schools. As I indicated in my earlier letter, my doctoral disseration research is related to school facility adequacy and state involvement or non-involvement in planning school facilities. I would like to include your state in the mailing of a questionnaire as part of this research.

At this point, the need is for information on what public high schools have been constructed or modernized within the last three to twenty years in school districts of particular metropolitan statistical areas. If your office has such information at hand, I would greatly appreciate a list of same. If not, I'd like to request address information for the public school districts serving the metropolitan areas listed below. If there is a particular person in a district whom you would recommend as a contact, that information, also, would be most helpful. Again, if there is a fee for obtaining this information, I would be happy to remit same. A self-addressed, stamped envelope is enclosed for reply. The assistance your office has already provided is very much appreciated.

Sincerely,

/s/ Antoinette E. Turnquist

Antoinette E. Turnquist
3521 Jones Street
Omaha, NE 68150

November 5, 1990

Director of Business Services
School District
Street Address
City, State Zip

Dear :

As a doctoral student in educational administration at the University of Nebraska-Lincoln, I am currently working on research for a dissertation in the area of school building adequacy and state guidelines for eucational specifications documents for construction and renovation.

Your state's Department of Education has referred me to you as the contact person in your school district who could provide the information needed for the next step in the above research. Would you identify on the enclosed form the name, address, and principal's name of high schools in your school district that have been constructed or renovated within the last three to twenty years? If you have the dates of the construction/renovation projects, that would be helpful, also.

Enclosed is a stamped, self-addressed envelope for return of the form. Thank you very much for your attention to this request.

Sincerely,

/s/ Antionette E. Turnquist

Antoinette E. Turnquist
3521 Jones Street
Omaha, NE 68105

January 6, 1991

Name, Principal
School Name
Street Address
City, State Zip

Dear Principal:

As a doctoral student in educational administration at the University of Nebraska-Lincoln, I am currently working on research for a dissertation in the area of school building adequacy and state guidelines for educational specifications documents for construction and renovation.

Your district has referred me to you as principal of a high school that has been constructed or renovated within the last twenty years.

Enclosed are 25 copies of a questionnaire on school facility adequacy. Would you be so kind as to ask classroom teachers in your school to complete the questionnaires?

Enclosed is a stamped, self-addressed envelope for return of the questionnaires. Thank you very much for your attention to this request.

Sincerely,

/s/ Antoinette E. Turnquist
3521 Jones Street
Omaha, NE 68105

February 27, 1991

Name, Principal
School Name
Street Address
City, State Zip

Dear Principal:

Last month you received copies of a survey on school facility adequacy with a request that you ask classroom teachers in your school to complete the questionnaire. Your state is one of the few in the nation that has guidelines for the development of educational specifications documents in the construction or renovation of a school building. Because of that, the response to the questionnaire from teachers in your state is an especially important part of this research project.

Questionnaires returned from your state are essential for the completion of my doctoral dissertation. If it is still possible to enlist the help of classroom teachers in your school in the completion of the survey, I would be most grateful. If the copies of the questionnaire mailed to you in January are not at hand, I would gladly send another set. If more copies are needed and you would be willing to ask your staff to respond, please so indicate on the bottom of this letter and return it to me in the enclosed, stamped, self-addressed envelope.

If you were planning to send the completed questionnaire copies soon, I thank you for your participation and look forward to receiving them. You willingness to assist in this survey is deeply appreciated.

Sincerely,

/s/ Antoinette E. Turnquist

Antoinette E. Turnquist
3521 Jones Street
Omaha, NE 68105

APPENDIX C

Weighted Responses to Questionnaires

TABLE C-1

Weighted Responses to Questionnaires from Subjects in Selected States with Guidelines for Developing Educational Specifications and Calculated Weighted Means for Each Question

Question Number	Response Choices	States with Guidelines			Response Weight	Question Mean
		Alaska	New Jersey	New Hampshire		
1	SA*	5	12	14	4	3.750
	A	0	0	8	3	
	D	0	0	1	2	
	SD	0	0	0	1	
2	SA	3	7	9	4	3.350
	A	2	4	10	3	
	D	0	1	4	2	
	SD	0	0	0	1	
3	SA	1	9	8	4	3.225
	A	3	2	8	3	
	D	1	1	7	2	
	SD	0	0	0	1	
4	SA	1	5	8	4	3.275
	A	2	5	11	3	
	D	2	1	7	2	
	SD	0	1	0	1	
5	SA	2	0	6	4	3.225
	A	3	2	11	3	
	D	0	1	5	2	
	SD	0	0	1	1	
6	SA	0	7	4	4	2.975
	A	3	4	11	3	
	D	2	0	8	2	
	SD	0	1	0	1	
7	SA	0	4	5	4	2.825
	A	2	8	8	3	
	D	3	0	7	2	
	SD	0	0	3	1	

*SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree

TABLE C-1 (continued)

Question Number	Response Choices	States with Guidelines			Response Weight	Question Mean
		Alaska	New Jersey	New Hampshire		
8	SA	2	0	11	4	2.825
	A	3	1	7	3	
	D	0	8	4	2	
	SD	0	3	1	1	
9	SA	0	2	5	4	2.525
	A	2	7	6	3	
	D	2	2	6	2	
	SD	1	1	6	1	
10	SA	0	3	3	4	2.400
	A	4	5	3	3	
	D	1	3	10	2	
	SD	0	1	7	1	
11	SA	5	8	8	4	3.450
	A	0	3	14	3	
	D	0	1	0	2	
	SD	0	0	1	1	
12	SA	3	5	6	4	3.150
	A	2	6	12	3	
	D	0	1	3	2	
	SD	0	0	2	1	
13	SA	2	9	7	4	3.375
	A	2	3	14	3	
	D	1	0	2	2	
	SD	0	0	0	1	
14	SA	4	9	8	4	3.475
	A	1	3	13	3	
	D	0	0	2	2	
	SD	0	0	0	1	
15	SA	0	7	6	4	3.225
	A	5	5	15	3	
	D	0	0	3	2	
	SD	0	0	0	1	

TABLE C-1 (continued)

Question Number	Response Choices	States with Guidelines			Response Weight	Question Mean
		Alaska	New Jersey	New Hampshire		
16	SA	0	4	4	4	3.176
	A	5	6	14	3	
	D	0	2	1	2	
	SD	0	0	14	1	
17	SA	2	3	4	4	3.000
	A	3	8	14	3	
	D	0	1	2	2	
	SD	0	0	3	1	
18	SA	2	3	4	4	2.975
	A	3	7	13	3	
	D	0	2	4	2	
	SD	0	0	2	1	
19	SA	0	4	2	4	2.650
	A	4	5	9	3	
	D	1	3	8	2	
	SD	0	0	4	1	
20	SA	1	3	5	4	2.925
	A	3	8	11	3	
	D	1	1	4	2	
	SD	0	0	3	1	
21	SA	0	1	4	4	2.750
	A	4	8	10	3	
	D	1	3	6	2	
	SD	0	1	3	1	
22	SA	0	3	4	4	2.750
	A	4	6	11	3	
	D	0	1	6	2	
	SD	1	2	2	1	
23	SA	1	3	8	4	2.875
	A	3	6	9	3	
	D	1	0	5	2	
	SD	0	0	1	1	

TABLE C-1 (continued)

Question Number	Response Choices	States with Guidelines			Response Weight	Question Mean
		Alaska	New Jersey	New Hampshire		
24	SA	1	6	7	4	3.150
	A	3	4	10	3	
	D	1	2	6	2	
	SD	0	0	1	1	
25	SA	1	4	6	4	3.050
	A	4	7	10	3	
	D	0	1	6	2	
	SD	0	0	1	1	
26	SA	2	8	4	4	3.150
	A	3	3	12	3	
	D	0	1	7	2	
	SD	0	0	0	1	
27	SA	5	8	5	4	3.175
	A	0	3	9	3	
	D	0	1	8	2	
	SD	0	0	1	1	
28	SA	1	5	2	4	2.775
	A	2	6	10	3	
	D	2	1	8	2	
	SD	0	0	3	1	
29	SA	1	4	3	4	2.800
	A	1	6	12	3	
	D	1	2	7	2	
	SD	2	0	1	1	
30	SA	0	5	5	4	2.825
	A	2	6	10	3	
	D	2	0	5	2	
	SD	1	1	4	1	
31	SA	1	3	4	4	2.725
	A	1	7	11	3	
	D	2	0	5	2	
	SD	1	2	3	1	

TABLE C-1 (continued)

Question Number	Response Choices	States with Guidelines			Response Weight	Question Mean
		Alaska	New Jersey	New Hampshire		
32	SA	1	4	3	4	2.650
	A	1	5	10	3	
	D	2	1	7	2	
	SD	1	2	3	1	
33	SA	1	3	2	4	2.650
	A	0	6	13	3	
	D	3	1	6	2	
	SD	1	2	2	1	
34	SA	1	2	3	4	2.700
	A	2	9	9	3	
	D	2	1	7	2	
	SD	0	0	4	1	
35	SA	1	2	4	4	2.725
	A	3	6	8	3	
	D	1	3	10	2	
	SD	0	1	1	1	
36	SA	1	4	10	4	3.250
	A	2	8	10	2	
	D	2	0	3	2	
	SD	0	0	0	1	
37	SA	1	3	5	4	2.900
	A	2	8	10	3	
	D	1	1	7	2	
	SD	1	0	1	1	
38	SA	0	4	6	4	2.950
	A	3	7	10	3	
	D	1	1	6	2	
	SD	1	0	1	1	
39	SA	0	4	12	4	3.225
	A	3	5	10	3	
	D	2	2	1	2	
	SD	0	1	0	1	

TABLE C-1 (continued)

Question Number	Response Choices	States with Guidelines			Response Weight	Question Mean
		Alaska	New Jersey	New Hampshire		
40	SA	4	4	9	4	3.325
	A	1	6	12	3	
	D	0	2	2	2	
	SD	0	0	0	1	
41	SA	4	4	9	4	3.300
	A	1	6	12	3	
	D	0	2	1	2	
	SA	0	0	1	1	
42	SA	4	3	9	4	3.325
	A	1	9	11	3	
	D	0	0	3	2	
	SD	0	0	0	1	
43	SA	4	4	10	4	3.275
	A	1	5	9	3	
	D	0	3	4	2	
	SD	0	0	0	1	
44	SA	3	4	5	4	2.950
	A	2	7	7	3	
	D	0	1	9	2	
	SD	0	0	2	1	
45	SA	1	2	7	4	3.000
	A	1	8	13	3	
	D	2	2	2	2	
	SD	1	0	1	1	
46	SA	1	0	3	4	2.625
	A	3	7	10	3	
	D	0	5	8	2	
	SD	1	0	2	1	
47	SA	2	1	5	4	2.800
	A	2	8	9	3	
	D	1	3	6	2	
	SD	0	0	3	1	

TABLE C-1 (continued)

Question Number	Response Choices	States with Guidelines			Response Weight	Question Mean
		Alaska	New Jersey	New Hampshire		
48	SA	1	5	3	4	2.675
	A	1	6	8	3	
	D	2	0	8	2	
	SD	1	1	4	1	
49	SA	2	5	4	4	2.775
	A	2	6	6	3	
	D	1	1	8	2	
	SD	0	0	5	1	
50	SA	3	2	9	4	3.250
	A	2	9	11	3	
	D	0	1	3	2	
	SD	0	0	0	1	
51	SA	4	6	8	4	3.275
	A	1	6	9	3	
	D	0	0	5	2	
	SD	0	0	1	1	
52	SA	3	5	6	4	3.125
	A	2	6	10	3	
	D	0	1	6	2	
	SD	0	0	1	1	
53	SA	2	4	3	4	2.900
	A	3	5	14	3	
	D	0	3	2	2	
	SD	0	0	4	1	
54	SA	4	5	5	4	2.900
	A	0	6	6	3	
	D	1	0	9	2	
	SD	0	1	3	1	
55	SA	3	5	6	4	2.525
	A	2	0	6	3	
	D	0	1	8	2	
	SD	0	0	3	1	

TABLE C-1 (continued)

Question Number	Response Choices	States with Guidelines			Response Weight	Question Mean
		Alaska	New Jersey	New Hampshire		
56	SA	3	8	6	4	3.175
	A	2	3	11	3	
	D	0	0	5	2	
	SD	0	0	1	1	

TABLE C-2

Weighted Responses to Questionnaires from Subjects in Selected States without Guidelines for Developing Educational Specifications and Calculated Weighted Means for Each Question

Question Number	Response Choices	States without Guidelines			Response Weight	Question Mean
		Nebraska	Kansas	Wisconsin		
1	SA*	20	15	14	3	3.58
	A	9	9	4	3	
	D	1	4	0	2	
	SD	0	0	0	1	
2	SA	12	10	1	4	2.64
	A	12	3	3	3	
	D	4	9	7	2	
	SD	2	6	7	1	
3	SA	15	14	4	4	2.95
	A	6	4	9	3	
	D	7	2	2	2	
	SD	2	8	3	1	
4	SA	10	9	4	4	2.86
	A	9	10	9	3	
	D	9	4	3	2	
	SD	2	5	2	1	
5	SA	12	10	6	4	2.97
	A	10	8	7	3	
	D	6	6	4	2	
	SD	2	4	1	1	
6	SA	18	9	3	4	3.09
	A	8	12	8	3	
	D	4	6	3	2	
	SD	0	1	4	1	
7	SA	3	1	1	4	2.11
	A	9	10	1	3	
	D	8	10	11	2	
	SD	10	7	5	1	
8	SA	4	2	5	4	2.55
	A	11	9	8	3	
	D	12	11	5	2	
	SD	3	6	0	1	

*SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree

TABLE C-2 (continued)

Question Number	Response Choices	States without Guidelines			Response Weight	Question Mean
		Nebraska	Kansas	Wisconsin		
9	SA	2	4	4	4	2.30
	A	5	10	5	3	
	D	11	10	7	2	
	SD	12	5	2	1	
10	SA	0	4	0	4	1.50
	A	1	6	0	3	
	D	4	4	4	2	
	SD	25	14	14	1	
11	SA	10	10	7	4	3.13
	A	12	14	9	3	
	D	6	3	2	2	
	SD	2	1	0	1	
12	SA	11	5	3	4	3.07
	A	13	14	6	3	
	D	6	8	6	2	
	SD	0	1	3	1	
13	SA	11	9	4	4	3.20
	A	17	15	13	3	
	D	2	3	0	2	
	SD	0	1	1	1	
14	SA	9	10	7	4	3.22
	A	18	15	9	3	
	D	3	3	1	2	
	SD	0	0	1	1	
15	SA	9	5	5	4	3.11
	A	19	15	13	3	
	D	2	7	0	2	
	SD	0	1	0	1	
16	SA	2	2	2	4	2.74
	A	19	17	11	3	
	D	8	7	5	2	
	SD	1	2	0	1	
17	SA	2	3	1	4	2.28
	A	12	8	5	3	
	D	11	11	7	2	
	SD	5	6	5	1	

TABLE C-2 (continued)

Question Number	Response Choices	States without Guidelines			Response Weight	Question Mean
		Nebraska	Kansas	Wisconsin		
18	SA	2	2	0	4	2.38
	A	14	11	9	3	
	D	10	10	5	2	
	SD	4	5	4	1	
19	SA	1	1	0	4	2.05
	A	11	7	2	3	
	D	9	14	11	2	
	SD	9	6	5	1	
20	SA	4	2	0	4	2.76
	A	21	18	11	3	
	D	3	7	6	2	
	SD	2	1	1	1	
21	SA	1	1	0	4	2.20
	A	11	12	6	3	
	D	10	9	8	2	
	SD	8	6	4	1	
22	SA	2	1	0	4	2.24
	A	8	11	10	3	
	D	12	10	5	2	
	SD	8	6	3	1	
23	SA	2	1	0	4	2.37
	A	14	11	9	3	
	D	9	13	5	2	
	SD	5	3	4	1	
24	SA	4	2	0	4	2.53
	A	14	13	11	3	
	D	8	10	5	2	
	SD	4	2	2	1	
25	SA	2	2	0	4	2.21
	A	13	7	3	3	
	D	8	16	10	2	
	SD	7	3	5	1	

TABLE C-2 (continued)

Question Number	Response Choices	States without Guidelines			Response Weight	Question Mean
		Nebraska	Kansas	Wisconsin		
26	SA	9	4	2	4	2.55
	A	9	9	10	3	
	D	6	10	2	2	
	SD	6	5	3	1	
27	SA	1	11	12	4	3.01
	A	15	14	5	3	
	D	9	3	1	2	
	SD	5	0	0	1	
28	SA	0	6	2	4	2.47
	A	14	9	5	3	
	D	14	9	9	2	
	SD	2	4	2	1	
29	SA	1	3	1	4	2.39
	A	16	7	10	3	
	D	11	9	5	2	
	SD	2	9	2	1	
30	SA	0	1	2	4	2.43
	A	15	13	10	3	
	D	11	8	5	2	
	SD	4	6	1	1	
31	SA	0	1	1	4	2.29
	A	14	12	7	3	
	D	7	11	8	2	
	SD	9	4	2	1	
32	SA	1	1	2	4	2.38
	A	12	13	8	3	
	D	11	9	7	2	
	SD	6	5	1	1	
33	SA	2	2	2	4	2.58
	A	11	14	12	3	
	D	14	10	4	2	
	SD	3	2	0	1	

TABLE C-2 (continued)

Question Number	Response Choices	States without Guidelines			Response Weight	Question Mean
		Nebraska	Kansas	Wisconsin		
34	SA	9	3	2	4	2.71
	A	10	17	5	3	
	D	7	7	10	2	
	SD	4	1	1	1	
35	SA	5	3	2	4	2.70
	A	12	16	10	3	
	D	9	8	6	2	
	SD	4	1	0	1	
36	SA	3	3	1	4	2.59
	A	12	12	12	3	
	D	13	10	5	2	
	SD	2	3	0	1	
37	SA	2	3	0	4	2.37
	A	12	9	8	3	
	D	11	12	8	2	
	SD	5	4	2	1	
38	SA	3	3	0	4	2.37
	A	9	9	10	3	
	D	12	12	6	2	
	SD	6	4	2	1	
39	SA	2	4	1	4	2.21
	A	11	8	1	3	
	D	11	11	9	2	
	SD	6	5	7	1	
40	SA	1	10	3	4	2.76
	A	18	11	7	3	
	D	8	7	5	2	
	SD	3	0	3	1	
41	SA	2	9	5	4	2.80
	A	17	9	10	3	
	D	8	6	3	2	
	SD	3	4	0	1	
42	SA	2	6	2	4	2.74
	A	14	16	12	3	
	D	11	5	2	2	
	SD	3	1	2	1	

TABLE C-2 (continued)

Question Number	Response Choices	States without Guidelines			Response Weight	Question Mean
		Nebraska	Kansas	Wisconsin		
43	SA	2	5	4	4	2.59
	A	9	13	11	3	
	D	13	7	2	2	
	SD	6	3	1	1	
44	SA	1	2	4	4	2.34
	A	7	10	8	3	
	D	15	13	4	2	
	SD	7	2	2	1	
45	SA	10	9	2	4	3.03
	A	15	9	14	3	
	D	4	9	2	2	
	SD	1	1	0	1	
46	SA	3	0	1	4	1.92
	A	5	3	1	3	
	D	13	19	8	2	
	SD	9	6	8	1	
47	SA	1	1	1	4	2.25
	A	13	11	4	3	
	D	9	12	9	2	
	SD	7	4	4	1	
48	SA	4	5	0	1	2.45
	A	15	12	5	3	
	D	7	8	4	2	
	SD	4	3	9	1	
49	SA	1	4	0	4	2.22
	A	9	11	5	3	
	D	12	12	4	2	
	SD	8	1	9	1	
50	SA	11	19	6	4	3.34
	A	16	9	7	3	
	D	3	0	3	2	
	SD	0	0	2	1	

TABLE C-2 (continued)

Question Number	Response Choices	States without Guidelines			Response Weight	Question Mean
		Nebraska	Kansas	Wisconsin		
51	SA	15	22	7	4	3.57
	A	14	5	8	3	
	D	1	1	3	2	
	SD	0	0	0	1	
52	SA	15	21	5	4	3.50
	A	14	6	12	3	
	D	1	1	1	2	
	SD	0	0	0	1	
53	SA	3	3	0	4	2.70
	A	17	14	11	3	
	D	10	10	7	2	
	SD	0	1	0	1	
54	SA	1	5	2	4	2.70
	A	15	17	12	3	
	D	9	4	4	2	
	SD	5	2	0	1	
55	SA	1	2	3	4	2.33
	A	14	10	10	3	
	D	7	9	2	2	
	SD	8	4	3	1	
56	SA	2	10	2	4	3.04
	A	23	14	15	3	
	D	4	4	1	2	
	SD	1	0	0	1	